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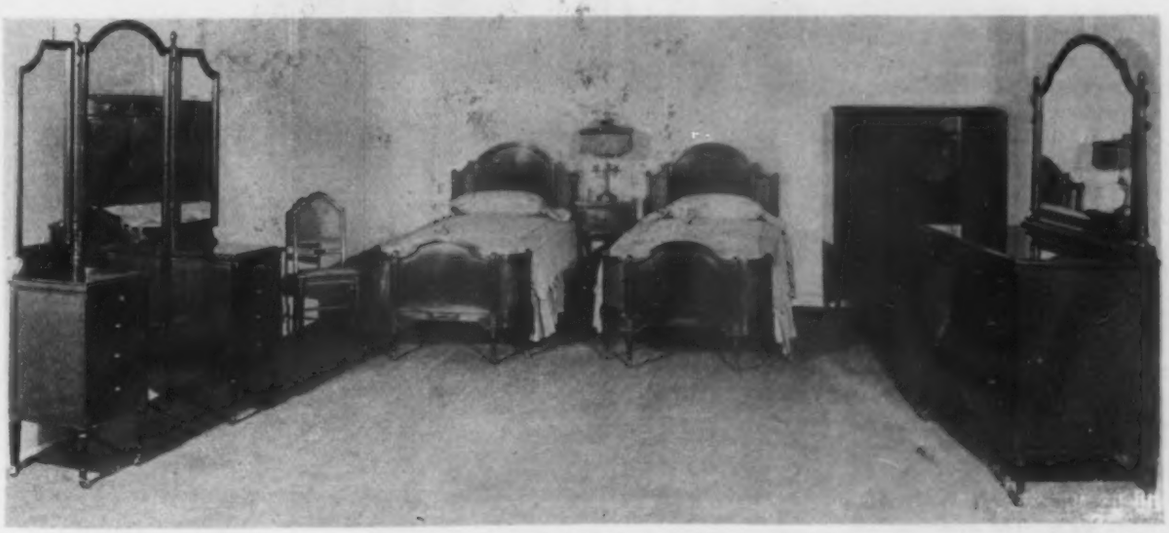
Furniture–An Important New Use for Steel

Simmons Company at Kenosha Plant Has Inaugurated Comprehensive Program for Manufacture of Complete Bed Room Suites from Steel

BY GILBERT L. LACHER

IN new uses for rolled steel are to be found one of the greatest promises for the continued growth of an industry which owes much of its present high state of development to the uninterrupted expansion in the utilization of the metal for an ever increasing diversity of purposes. Uses for steel which are still relatively new, now take a large proportion of the tonnage rolled in American mills. The all-steel railroad car, the automobile and the fabricated steel skyscraper are all products of the last two or three decades. The use of steel for beds was also developed during that period and in relatively recent years the manufacture of steel office furniture had its inception. Now steps are being taken which forecast the use of steel for manufacturing all articles of furniture which are now made from wood.

It is not surprising that the first to enter this broad field is the Simmons Co., New York, long a leading



Steel Bed Room Furniture in the Finished State

Drawer Frames are Fabricated by Fitting Together Tubing Cut to Proper Length on a Jig. The workman is shown brazing the joints together with an acetylene torch

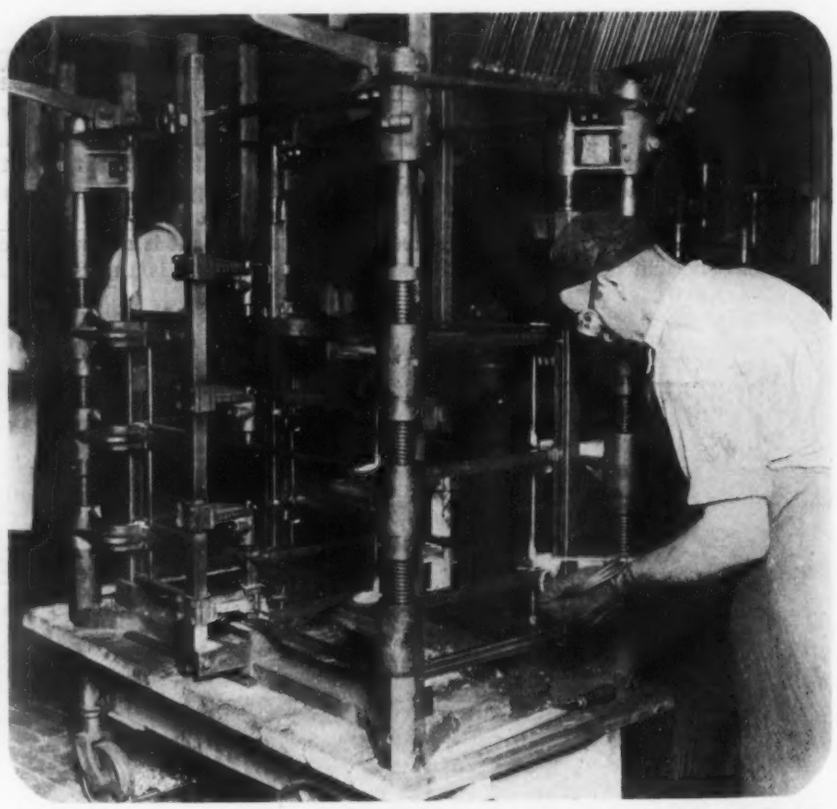
factor in the metal bed industry. As late as March of this year experiments were initiated which have led to the inauguration of steel furniture manufacture on a production basis. This work has been done at the company's parent plant at Kenosha, Wis., and so well satisfied is the management with the results achieved that it is now constructing a large new factory building there which will be devoted entirely to this new branch of its business. Thus far only bedroom furniture has been made, but it is not unreasonable to assume that the same advantages which led to the manufacture of chamber suites will cause steel to be employed also in making other classes of household furniture.

The present program, even though limited to bedroom furniture, is a comprehensive one, including nine distinct suites, consisting of ten or eleven separate pieces, exclusive of beds. The different articles made comprise dresser, chiffonier, chifforette, chifforobe, full vanity, semi-vanity, bench, chair, rocker, bedside table and dressing table. In some of the suites the dressing table is omitted. Special pieces include grip stand, writing desk, and a combination wardrobe and desk known as a chiffrodesk.

The present production of these articles is 300 pieces a day, but with the completion of the new plant building next winter the output will be increased ten-fold. This structure, now under construction, will be 100 x 280 ft. and six stories high. The first floor will be used for the storage of steel, the second and third stories for manufacturing, the fourth for packing, and the fifth and sixth for finishing. Dressers, chiffoniers and dressing tables will be made in this building and the remaining pieces will continue to be produced in the main works pending the erection of further additions which, according to present plans, will comprise three structures of the same size as the one now being built.

The materials used for making the furniture consist largely of two classes of steel, cold-finished sheets and cold-rolled strip steel. The framework of each piece is made from seamless tubing electrically welded, which is drawn from No. 20 and No. 28 cold rolled strip in widths ranging from 8 in. down to 2 in. Five shapes of tubing are used for most of this work. Irregular shapes used, for example, for certain designs of legs and mirror posts, are formed from tubing in swaging machines. The tops of the furniture and the fronts of doors are made from No. 20 gage cold-finished patent-leveled black sheets. The sides, backs and bottoms are formed from No. 24 gage cold-finished black sheets. The proportions of sheets and strip steel used are in the ratio of 60 to 40.

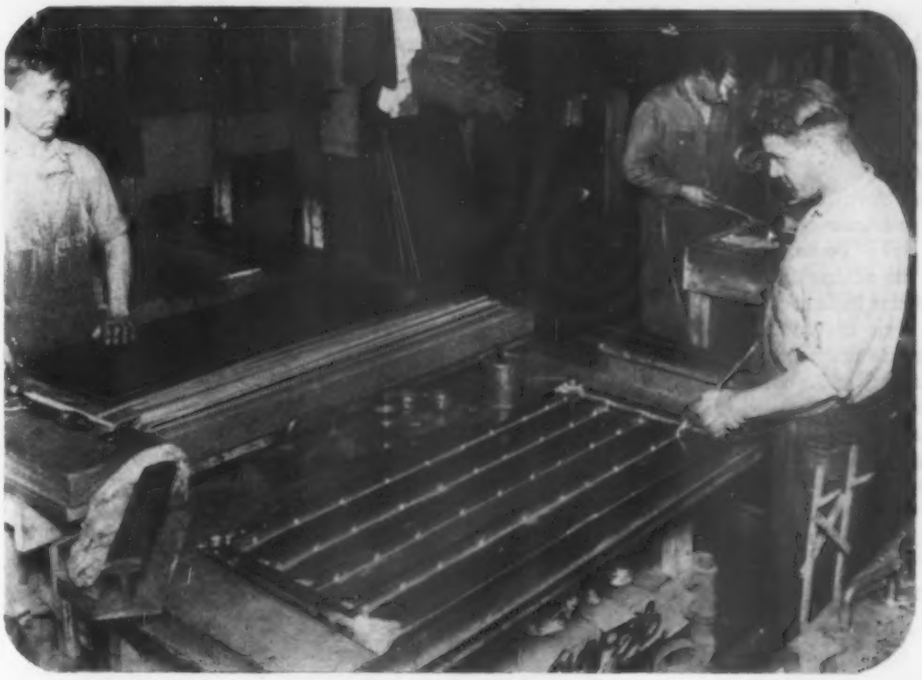
The amount of steel used for a bedroom suite, exclusive of the beds, averages 750 lb. Upon the completion of the new plant within the next few months, production will be raised to 300 suites a day, requiring



The Drawer Frames and the Bottom Frame of the Dresser are Fitted with Corner Pillars, Forming a Framework Which Is Inverted on a Jig and Brazed Together. The workman is shown brazing one of the joints

225,000 lb. At this rate the consumption of steel annually will be 20,250 tons of sheets and 13,500 tons of strip. This, of course, is only a beginning and does not indicate the great possibilities for the expansion of the industry.

Offhand, it might be assumed that steel, while adapted for the simpler designs of furniture, could not be put on a competitive basis with the hardwoods for



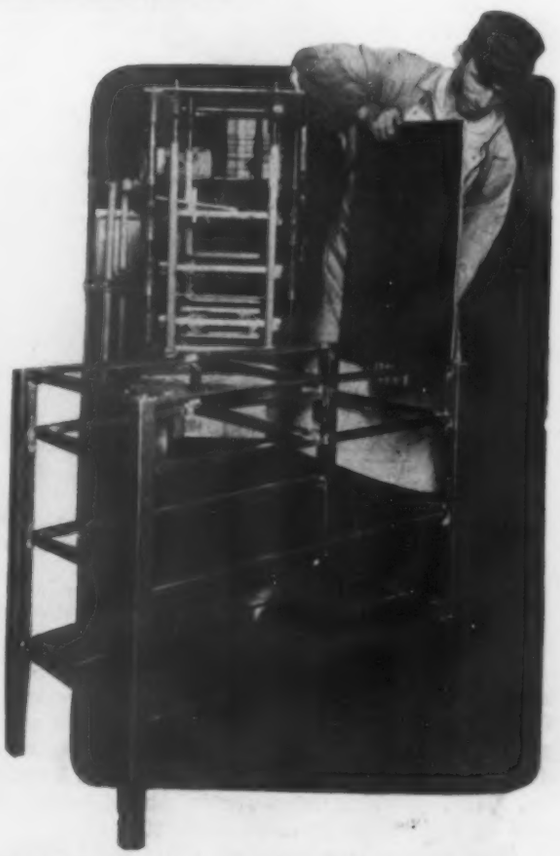
At Left: The Top of the Dresser Is Made Separately With Careful Attention to Deadening. The top sheet is laid on a work bench bottom side up and the frame and stiffeners are brazed and soldered into place. Underneath the stiffening members are strips of deadening material. The workmen are shown soldering the stiffeners to the top sheet

types of products in which beauty of finish and grace of lines are embodied. At first glance, this seems a logical assumption and probably explains why the possibilities of steel for this purpose were not developed long before this. Needless to say the Simmons Co. did not make the new venture until it had satisfied itself that intricacies of design and excellence of finish are not insurmountable obstacles to the successful employment of steel for furniture.

In developing its metal beds it had made great progress in improving the finish of its product. It was not until this year, however, that it succeeded in producing what is known as a piano finish and in simulating the grain of hard wood so that it could not be distinguished from the genuine except by the most experienced eye. Of course, the thought occurs that there is often initial prejudice against an imitation merely because it is an imitation, but this consideration is outweighed by what are regarded as more important factors. From the standpoint of finish, for example, steel has a marked advantage over wood. Steel can stand the high temperatures necessary for the baking of enamel—something which is impossible with wood.

When giving steel furniture a so-called wood finish, the first operation is to put on a priming coat of a solid color. Then workmen of great skill paint on the coarser grain. The next step is to give the piece another solid coat of darker hue, following which the finer grain is put on. This is accomplished by drawing brushes intermittently across the surface, the brushes serving to remove the second solid coat and to expose the first in a fine stippled effect. Both of the graining operations are entirely free hand with the consequence that the work entirely lacks the artificial appearance of a printed or stenciled grain.

After the priming and graining, the furniture is given one, two, or three coats of varnish, depending on the selling price of the suite. After each coat of varnish has been applied the furniture is placed on small tray cars and run into kilns where it is baked one hour at 300 deg. Fahr. Following the final baking, the furniture is given a "pummy" rub and then it is polished. Furniture is also enameled in solid colors, in which case it is baked at 180 to 200 deg. Fahr. for four to five hours, subsequently receiving the same pummy rubbing and polishing as the wood-finish pieces. The enamels and varnishes baked in kilns are obviously



Below: After Being Assembled, the Framework of the Dresser Is Turned Right Side Up and the Sheets Forming the Sides and Back Are Inserted

more permanent and more impervious to abuse than any finish which can be put on wood. A forgotten cigarette left on a piece of steel furniture will burn itself out without spoiling the finish. No perfume or ordinary cleanser will damage it.

In addition to possessing an advantage in finishing possibilities, steel is also far more substantial than

wood. Caster spindles will not split the legs of steel furniture. Rough handling will not loosen the members of any piece, nor cause chipping and marring which require refinishing. Changes in temperature do not affect the easy sliding qualities of drawers. Notwithstanding that the danger of damage has been reduced to a minimum, construction of the furniture is such as to permit the easy removal of tops and sides for replacement from the company's stocks of spare parts.

An important feature of steel construction which should not be overlooked is that the cheapest bedroom suite differs not one iota from the most expensive in strength and durability. The lower price is not, as in the case of wood, an indication of less substantial construction; it merely means a less intricate design perhaps, or fewer coats of finish.

The fabrication of steel furniture can best be described by following the various operations in the manufacture of one of the commoner pieces — a dresser. The drawing of the tubing is done on a royalty basis and this work at the instance of the patentee is kept secret. From the time the tubing comes from the mill there are 280 separate operations on a dresser before it is ready for painting and enameling. Many of these are done on punch presses, there being fully forty power presses for the furniture department alone, not counting those employed on bed work. The presses, of course, employ a large number of dies to perform the numerous operations required on both the tubing and the sheets. All sheets go through a patent level-

Dresser Drawers Are Assembled Entirely from Five Separate Sheet Stampings—Front, Back, Bottom and Sides. The workman is shown hanging the lipped sides on to the bottom. When he has assembled the drawer he brazes the bottom corners

A Frame Is Slipped Over the Top of the Drawer Before Brazing the Top Corners

ing process before they receive any other treatment. This is a stretching process which takes out all waves in the surface of the metal, and is performed on a special machine built by the Torrington Mfg. Co., Torrington, Mass., in which the power for stretching is supplied by hydrostatic pressure up to 3000 lb.

After the various parts of a dresser have been formed, they are brazed, welded and bolted together. The first fabricating operation is the forming of the drawer frames. This is accomplished by fitting together tubing cut to the proper length, on a jig and then brazing the joints with an acetylene torch, using borax as a flux. The bottom frame is similarly assembled on a jig, following which a bottom sheet is electrically welded to the frame members. Then the corner pillars are fitted into the bottom and drawer frames, whereupon the resulting framework is inverted on a jig and brazed together. Only the front corners, where a dresser undergoes the greatest strain, are lock-jointed, the back corners of the frames being brazed butt up against the pillars. The legs of the dresser, it is to be noted, are integral with the corner pillars and are hollow at the extremities so that casters may be inserted or removed at will. The taper in the legs is formed by cutting triangular pieces out of two opposite corners of the four corners of the tubing and then pressing the edges together and steel welding them. After welding, the tapered surface is ground and polished.

Following the assembling of the framework of the dresser, it is turned right side up and the sheets forming the sides and back are slid in from the top through grooves in the corner pillars. The top is made separately with careful attention to deadening so that it will not give forth a metallic sound upon impact with another object. The top sheet, which is stamped out so that it has lips extending at right angles from it on the front and sides, is laid on a flat work bench for the insertion of the frame. The main frame, consisting of four pieces of rectangular tubing laid inside the four

Bolts Projecting from the Mirror Posts Are Used to Fasten Mirror to Dresser. A brace extending from the base rail into a socket in the back of the dresser makes the construction even more secure

sides of the top sheet, is brazed together and to the inside of the lips of the sheet at the corners. Then three narrow strips of deadening material are laid parallel lengthwise across the bottom of the top sheet, and three cross braces of tubing are superimposed on the strips. The next step is the soldering of the braces to the top sheet. Two cups, or "locating pommels" are brazed to the rear corners to locate the top accurately when it is inverted on the framework of the dresser. To neutralize the acid used before applying the solder to the braces, the entire bottom of the top is thoroughly painted after it has been assembled. To permit of the easy removal of the top from the framework of the dresser, bolt fastenings are used.

Dresser drawers are assembled entirely from five separate sheet stampings—front, back, bottom and sides. The stampings are provided with lips on edges which fit together, while those edges which remain exposed in the assembled drawer are rolled to prevent the cutting of fingers or the tearing of clothing.

In assembling a drawer the initial operation is the fitting together of the five parts. The bottom stamping is first placed bottom side up on a flat top frame. On top of this stamping is placed a sheet of deadening material and then the side stampings are hung on. After the lipped front and back pieces have been fitted over the sides, the bottom stamping is brazed at the corners to the other four pieces. The drawer is then turned right side up and a frame is slipped over it to hold the top corners firmly together for brazing.

Both the frames used in assembling are made with extreme care, as it is essential that drawers be assembled accurately within 1/32 in. to fit the drawer frames in the dresser. After the corners of the drawer have been brazed both at the bottom and at the top, the lips projecting over the corners are electrically spot welded. To facilitate this operation indentations are made in the lips of the stampings before they reach the drawer assembling department. To prevent the deadening sheet from bulging out from the bottom of the drawer, a retainer button located in the center of the deadener is spot welded to the drawer.

The advantage of steel construction over wood is again apparent in the manner in which the mirror posts are fastened to the dresser. Bolts from the mirror posts pass through the base rail and engage nuts in the framework of the dresser. The posts are fastened to the base rail by set screws located in the back of the rail. These screws hold in place a pommel in which the mirror post is anchored. The effect of the pommel is to hold the post securely to the rail without preventing one from turning the post when screwing the fastening bolt into the framework of the dresser. A brace extending from the middle of the bottom of the base rail is inserted in a socket in the back of the dresser and is then bolted to the framework. This method of fastening is so secure that a dresser may be pulled by a post across a bedroom without loosening post or base rail a particle.

The mirrors are held in their frames by small fastening plates bolted on the back. This method of holding the glass is more secure than fastening with finishing nails tacked against cardboard, such as is the practice with wooden frames, and at the same time permits the quick removal of the mirror for replacement.

The advantage of steel construction is even more pronounced for some bedroom pieces of less compact design than a dresser. Dressing tables, for example, have long spindly legs which, when constructed of wood, frequently get out of true or are loosened to the extent of necessitating repairs. In steel construction the legs are screwed on and extend the entire distance from the floor to the top of the table, being anchored in sockets in the inside of the corners of the drawer frames. This insures a maximum of rigidity and enables the steel dressing table to stand fully ten times as much weight as a wooden table.

In such minor particulars as embossed decorations, steel furniture is also superior to its wooden competitor. Rosettes on wooden furniture are either carved from wood or die cast from wood pulp. In

The Lips Projecting Over the Corners of the Drawer Are Electrically Spot Welded

either case, the rosette is glued to the furniture. Rosettes used on steel furniture, on the other hand, are die cast from brass and are riveted in place.

Throughout all assembling operations prior to enameling, the steel parts used are kept thoroughly coated with oil to prevent rusting.

What of the cost and weight of steel furniture as compared with the wooden product? Costs are sufficiently low to permit the Simmons Co. to sell at lower prices than those quoted on high-grade hardwood furniture. The weight of steel furniture is only 12 per cent greater than that of hardwood.

AUGUST STEEL OUTPUT

Daily Rate 4294 Tons Less Than in July—Year's Rate About 42,380,000 Tons

Another low record for the year for steel ingot production, measured by daily rate, was registered in August. Despite the fact that this month's total exceeded July, the daily rate was 4294 tons per day less, or 136,276 tons compared with 140,570 tons, due to the larger number of working days—27 for August against 25 for July.

According to statistics gathered by the American Iron and Steel Institute the August production of companies which made 95.35 per cent of the country's total was 3,508,347 gross tons. This means a total for the country of 3,679,441 tons or 136,276 tons per day—a decline of 21,500 tons per day since the peak in April. The tables follow in gross tons:

Monthly Production of Steel Ingots, January, 1922, to December, 1922, Reported by Companies which made 84.15 per cent of the Steel Ingot Production in 1922

Months 1922	Open-hearth	Bessemer	All other	Calculated monthly production all companies	Approximate daily production all companies Gross tons
Jan.	1,260,809	331,851	822	1,891,857	72,764
Feb. ...	1,395,835	348,571	616	2,071,772	86,324
March ..	1,918,570	451,386	795	2,814,667	104,247
April ...	1,997,465	445,939	1,109	2,902,240	116,090
May ...	2,214,774	494,893	1,474	3,218,794	119,215
June ...	2,143,708	487,851	2,918	3,127,775	120,299
July ...	2,020,572	464,047	2,485	2,952,806	118,112
Aug. ...	1,807,310	404,379	2,893	2,629,256	97,380
Sept. ...	1,911,147	460,127	2,505	2,818,261	108,395
Oct.	2,352,207	518,010	2,198	3,410,265	131,164
Nov. ...	2,360,903	525,945	2,449	3,430,309	131,935
Dec. ...	2,241,104	536,214	2,572	3,300,416	132,017
Total .	23,624,404	5,469,213	22,836	34,568,418	111,511

Monthly Production of Steel Ingots, January, 1923, to August, 1923, Reported for 1923 by Companies which made 95.35 per cent of the Steel Ingot Production in 1922

Months 1923	Open hearth	Bessemer	All other	Calculated monthly production all companies	Approximate daily production all companies Gross tons
Jan.	2,906,892	728,270	9,467	3,822,369	141,569
Feb. ...	2,613,564	669,903	10,797	3,454,918	143,955
March ..	3,046,309	799,525	12,841	4,046,854	149,883
April ...	2,974,579	772,485	13,933	3,944,412	157,776
May ...	3,136,558	847,418	16,719	4,195,800	155,400
June ...	2,821,239	737,845	15,483	3,748,890	144,188
July ...	2,658,449*	680,884	11,496	3,514,241*	140,570*
Aug. ...	2,797,962	701,059	9,326	3,679,441	136,276
8 Mos.	22,955,552	5,937,389	100,062	30,406,925	146,187

*Revised.

Plant Operations in Alabama

BIRMINGHAM, ALA., Sept. 10.—Repairs are being rushed on the blooming mill of the big Ensley steel plant of the Tennessee Coal, Iron & Railroad Co. The Gulf States Steel Corporation has plenty of basic iron to supply four open-hearth furnaces while the blast furnace is being repaired. The Ingalls Iron Works and other steel fabricating plants here are busy on structural steel work.

The Louisville & Nashville Railroad announces placing an order for 50,000 tons of steel rails, delivery during first half of 1924 in equal monthly installments with the Tennessee Coal, Iron & Railroad Co., Birmingham. Intimation is given that further orders may be placed by the road.

Two blast furnaces are under repairs in this State, the Gulf States Steel Co.'s stack at Gadsden, and the Shelby Iron Co.'s charcoal iron producer at Shelby. The Sloss-Sheffield Steel & Iron Co. will not start up the two furnaces blown out last month until the demand improves and a considerable part of its iron in the yards has been removed.

Machine Tool Exhibition at Yale University

The machine tool meeting and exhibition to be held at Yale University, New Haven, Sept. 18 to 20, will provide the following papers: Tuesday, Sept. 18, 8 p. m., "Yale and the Machine Tool Industry," by Prof. Charles H. Warren, dean of the Sheffield Scientific School; "Broader Aspects of Machine-Tool Application," by H. L. Seward, professor of mechanical engineering, Sheffield Scientific School. Sept. 19, 8 p. m., "The Origins of Machine-Tool Building," by J. W. Roe, professor of industrial engineering, New York University, and president of the Society of Industrial Engineers; "An Industrial Birthplace of Pioneer Machine Builders," by Guy Hubbard, engineer, National Acme Co., Windsor, Vt. Sept. 20, 8 p. m., "Operating Demonstration of New Machine Tools," by E. P. Bullard, Jr., president Bullard Machine Tool Co., Bridgeport, Conn., who will introduce the Contin-U-Matic chucking and turning machine.

It will be recalled that the meeting will be held under the joint auspices of the New Haven section of the American Society of Mechanical Engineers, the New Haven Chamber of Commerce and the mechanical engineering department of Yale University. The committee in charge is as follows: A. C. Jewett, chairman, A. F. Breitenstein, E. B. Crawford, Starr H. Barnum, N. E. Horn, C. E. Hulse, H. L. Seward, J. S. String, E. O. Waters, George E. Wood, S. W. Dudley and J. D. Marsh.

Coal Operators Oppose Assignment of Cars for Mine Purposes

WASHINGTON, Sept. 11.—Bituminous coal operators through a special committee on transportation last week filed a brief with the United States Coal Commission in which it was declared that the only effective remedy for the transportation problem, as it applies to the soft coal industry, "is the prevention of nation-wide strikes in the mine and rail industries." It was declared that shortages of the greatest duration and violence, in coal and transportation, have proceeded from strikes of national combinations of mine and rail workers. While it was stated that increased transportation would mitigate these shortages, it would not prevent them. Request was made by the operators that there be no assignment of cars for railroad fuel and that during periods of car shortage no open top cars be furnished wagon mines. It was urged that railroads receiving loaded coal cars from connections during periods of coal car shortage return an empty car for each loaded car received. The operators also suggested, as a means of protecting the supply of open cars, that every railroad engaged in coal traffic furnish its share of open top cars and keep the coal moving over its lines.

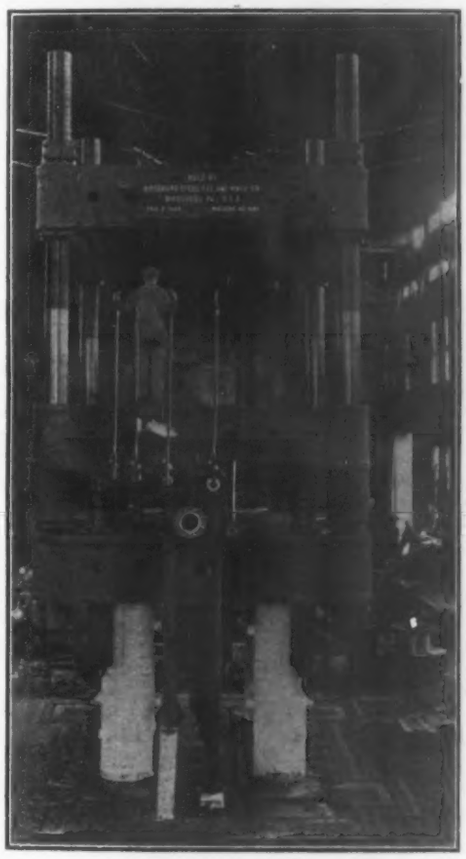
The National Association of Farm Equipment Manufacturers will hold its thirtieth annual convention at Cleveland, at the Hotel Statler, Oct. 24 to 26 inclusive. Among subjects which will be discussed are the simplification of agricultural machinery and machinery parts, transportation as it affects the implement industry, domestic and foreign trade, and modifications of the Federal Reserve Act in the light of recently enacted rural credits legislation.

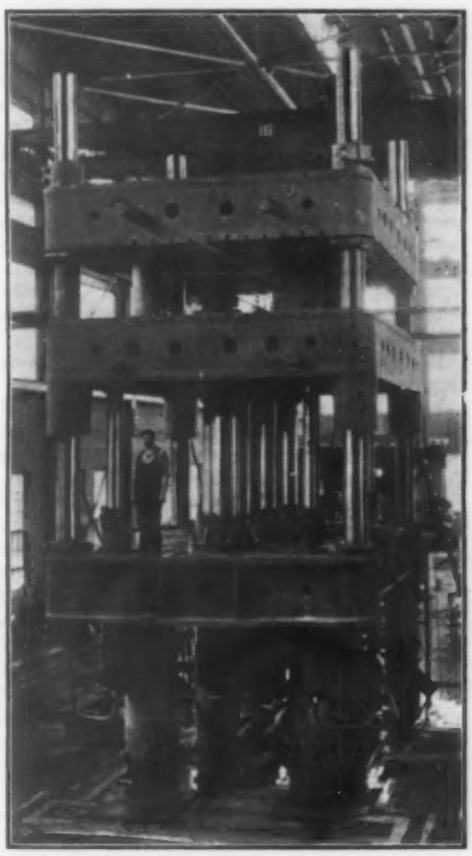
LARGE FLANGING PRESS

One-Piece Platens and Unique Valve Arrangement Are Features of 1200-Ton Unit

What is believed to be the largest press employed in flanging locomotive heads and saddles has been built recently by the Birdsboro Steel Foundry & Machine Works, Birdsboro, Pa., for the Altoona shops of the Pennsylvania Railroad, which has found it necessary to increase the tractive power of its heaviest locomotives. Boilers to generate higher steam pressures and give greater evaporation than used heretofore have had to be designed. Larger and heavier plates and fewer riveted joints have been found necessary to withstand the increased loading and assure a high measure of safety.

In building the press, two views of which are shown herewith, the design of the heavier parts and the problems involved in their transportation presented difficulties. The incorporation of single-piece machined open-hearth steel platens, made possible largely by new machine tool equipment, is a feature especially emphasized by the makers.





For Flanging Heads and Saddles for Locomotives at the Altoona Shops of the Pennsylvania Railroad, the Birdsboro Steel Foundry & Machine Works Built a Four Column Type Machine of 1200 Tons Capacity. Each column is 13 in. in diameter and 30 ft. in length. The platens are 15 x 18¼ ft. in size, giving a flanging bed 15 ft. square

The machine is the moving-up four-column type and has a capacity of 1200 tons, using an accumulator pressure of 1500 lb. per sq. in. The illustrations show the press on the erecting floor before shipment. When installed the machine will be placed in a foundation pit 18 x 25 x 18 ft., so that the floor level is slightly below the face of the middle platen, which is the moving member. The operating levers in the foreground indicate where the operator will stand.

There are four columns, each of which is 13 in. in diameter and 30 ft. in length. The clearance between the columns is 15 ft. one way and 11 ft. 11 in. the other. The platens are 15 ft. x 18 ft. 3 in., which is ample to permit flanging of the largest steel plates, a flanging bed of 15 x 15 ft. being available. The top and moving platens are provided with machined T-slots as shown, to permit of bolting of dies. The columns have long threads on the upper ends, thereby providing an adjustment of 12 ft. maximum to 5 ft. minimum between the top and moving platens. The inner nuts supporting the upper platen are in halves, the outer nuts being split on one side to permit the use of a wedge for slackening them while they are being raised or lowered in changing the clearances.

Six different pressures may be exerted. The press has three main cylinders and plungers, each 26 in. in diameter, with a lift of over 6 ft. By admitting 1500 lb. accumulator pressure to the center cylinder, 400 tons pressure will be exerted on the work. If pressure is admitted to the other two 26-in. cylinders simultaneously, 800 tons will be exerted and by applying pressure to the three cylinders 1200 tons are obtained. Three additional pressures may be exerted by using the four jack rams in conjunction with either of the three pressure combinations noted. These rams are 9 in. in diameter, and are used also for raising and controlling the motions of the moving platen while running idly up to the work, and to perform light flanging.

For stripping the work from the dies an auxiliary cylinder mounted on the center of the moving platen and moving with it, is used. Hydraulic pressure is transmitted to this cylinder through a set of swivel joints. Controlling valves are of the balanced metal-seated type, and are of a size to reduce friction and obtain quick up and down speeds. The speed of lifting and lowering the moving platen up and off the work is 25 ft. per min.

Power saving devices include an arrangement for the prefilling of the three main cylinders with water taken from an auxiliary tank, not shown, located approximately 20 ft. above the floor, while accumulator pressure is applied to the jack rams only. It is claimed that in this way the platen is lifted through the full stroke by using approximately 80 gal. of 1500-lb. pressure water, whereas if accumulator water were used on the three main cylinders, 500 gal. would be used.

A unique valve arrangement, requiring precise machine work, is incorporated. All the valves are hand operated, and have a minimum of packings. They have forged steel bodies bored from the solid, and bronze spindles and seats. One three-way valve is used for raising, checking and lowering the stripper ram, and another three-way valve is for controlling the stripper

ram and jack cylinders. A special valve is provided for filling, cutting off access to the tank, applying pressure, releasing pressure and exhausting the center main cylinder. A fourth valve, of large dimensions, is used for filling the two outside 26-in. cylinders, cutting off communication between these cylinders and the tank, applying the 1500 lb. pressure, releasing pressure and exhausting the two outside cylinders. The piping between the valves and the cylinders is either of open-hearth steel castings or double extra strength pipe.

The press weighs more than 300 tons. It is of cast steel throughout except for the plungers, which are of chilled iron, ground and polished, and the tension bolts, which are of forged steel. The latter were forged from ingots, made in the Birdsboro company's steel foundry. The magnitude of the castings may be judged from the manner of shipping the three large platens, which were loaded on special 12-wheel well cars. With the required blocking and suspension devices, the shipping limits were within 2 in.

Features of a French Automobile Plant

Andre Citroen Installs Tube and Billet Mills—Rapid Handling of Cars by Paint Drying System

ANDRE CITROEN, who is the largest manufacturer of automobiles in Europe, has what undoubtedly is in many respects the most complete automobile factory in the world in that he has been forced to make a larger number of his accessories than is necessary in this country. Thus he has established departments that few automobile concerns in this or any other country have had to include in their equipment.

For instance, in order to obtain tubes drawn from the proper stock and of the proper diameter he put in a complete tube mill. One of the accompanying illustrations shows a piercing press which is used in piercing the billets for drawing the tubes. This is one of the hydraulic presses he used during the war for making shells. The plant also has a tube press which performs a second operation on the tubes, after which they pass the regular draw benches and are drawn to the required diameter and thickness.

The Citroen factory also had difficulty in obtaining certain forms of bar stock and hence had to install a small rolling mill and purchase billets to make the special composition bars required for certain parts of its automobiles. A view is given of one of the rolling units in this mill. The department is in reality a small jobbing rolling mill turning out stock of the exact specifications required by the engineers.

This half tone also illustrates the constant tendency of the French to beautify their building by pleasing lines, the end of the building facing the street being ornamented with three arched windows.

The plant also has a complete electrical department in which are made the magnetos, the starters and all of the electrical equipment necessary for the car.

The French market still calls for individuality in cars, so that a plain japanned finished car cannot be sold to every Frenchman.

In order to take care of the drying of the paint in specially painted bodies which have to be given a considerable number of coats, with the necessary rubbing down after each coat, it has been necessary to install a paint drying system and a view of this is presented. The paint drying ovens are arranged in batteries with four in a line and two high, and the cars are put into the ovens by the use of power-driven transfer cars which bring in the automobile opposite the oven in which it is to go. It is then put on an elevator and can be run directly across this and into the lower tier of ovens or lifted and run into the upper tier of the ovens.

In the illustration (on the next page) the elevator in the foreground is delivering a car into the lower tier of ovens, while the elevators in the background are delivering into the upper tier of ovens. Similar elevators are arranged at the other end of the ovens for taking the cars out and passing them through to the rubbing departments. The equipment as installed makes it possible to handle the cars very rapidly, and by the proper control of the humidity in the ovens a rapid drying of the paint is assured, and at the same time the paint is so manipulated as to give a long life surface.

Advisers from Industry for Carnegie Institute

An advisory board of Pittsburgh business and scientific men has been organized to cooperate with the work of the department of mining and metallurgy of the Carnegie Institute of Technology. C. W. Heppenstall, president Heppenstall Forge & Knife Co., has been elected chairman of the board which includes the presidents, managers and executives of 22 large industrial firms in the Pittsburgh district.

The membership of the board includes, in addition to Mr. Heppenstall: F. B. Bell, president Edgewater Steel Co., Oakmont, Pa.; Earl Blough, technical director Aluminum Co. of America; V. B. Brown, general superintendent Allegheny Steel Co.; E. L. DeMare, manager Union Electric Steel Co.; A. N. Diehl, general superintendent Duquesne Steel Works, Carnegie, Pa.; George H. Faunce, president Pennsylvania Smelting Co.; A. C. Fieldner, United States Bureau of Mines; W. C. Fownes, Jr., Standard Seamless Tube Co.; J. O. Handy, Pittsburgh Testing Laboratory; F. B. Hufnagel, president Pittsburgh Crucible Steel Co.; Roy A. Hunt, vice-president Aluminum Co. of America; T. D. Lynch, Westinghouse Electric & Mfg. Co.; D. A. Lyons, chief metallurgist and supervisor of experimental stations, United States Bureau of Mines; C. F. W. Rys, chief metallurgical engineer Carnegie Steel Co.; F. N. Speller, chief metallurgical engineer National Tube Co.; S. G. Stafford, vice-president Vulcan Crucible Steel Co., Aliquippa, Pa.; B. N. Zimmer, manager American Zinc & Chemical Co.; F. I. Gaston, Jones & Laughlin Steel Co; Sidney A. Grayson, general manager Jessop Steel Co., Washington, Pa.; O. J. H. Hartsuff, general superintendent Edgar Thomson works, Carnegie Steel Co., Braddock, Pa.; W. E. Moore, president Pittsburgh Electric Furnace Corporation; and the following officials of Carnegie Institute of Technology: Dr. Thomas S. Baker, president; W. E. Mott, director College of Engineering; Fred Crabtree, head of the department of mining and metallurgical engineering; F. F. McIntosh, associate professor of metallurgy.

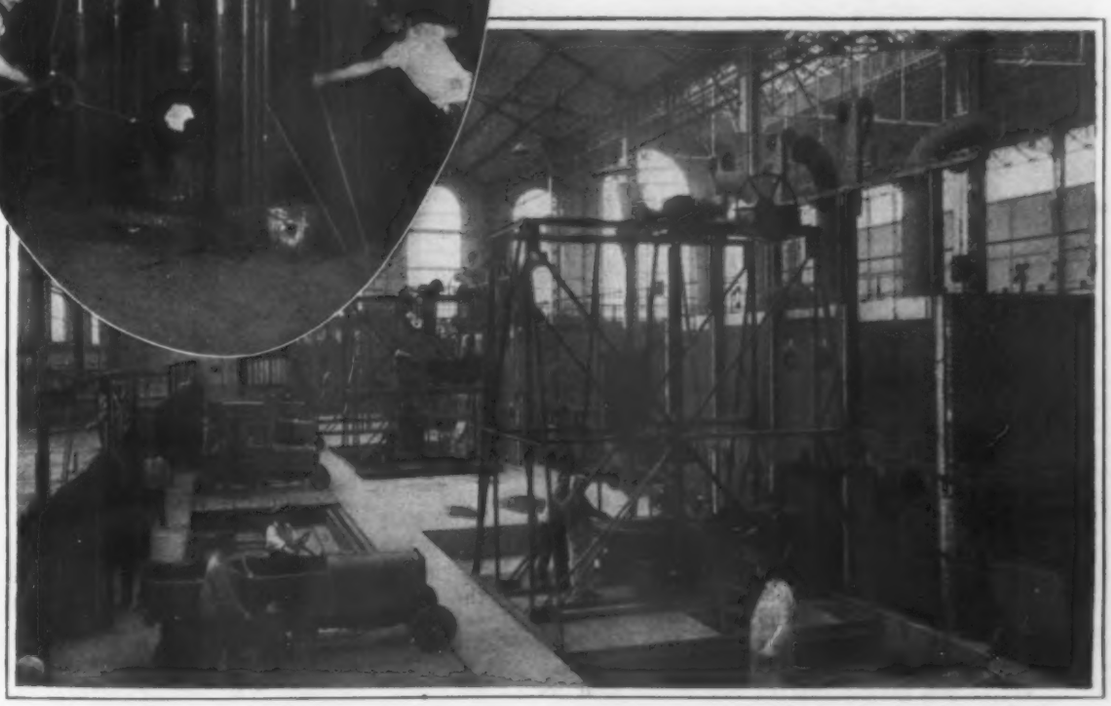
Cast Iron Pipe Produced in June and July

According to figures collected by the Department of Commerce, the June production of cast iron pipe was 81,208 tons, while the shipments amounted to 88,318 tons. Orders for pipe to be shipped from stock

Above: Rolling Mill at the Citroen Automobile Plant in Paris. This mill produces bars of special composition required for the Citroen car

The Press at the Left Was Built in War Time for Shell Forgings, But Is Now Used for Piercing Billets to Prepare Them for the Tube Mill

Below: Handling Appliances for Automobile Bodies. The paint drying ovens are arranged in batteries of four and double decked so there are eight ovens in each battery, and in front of the ovens there are elevators and transfer cars as shown, which handle the automobiles rapidly as they go in and out of the paint drying ovens



aggregated 17,905 tons; orders for pipe to be made on order reached 199,271 tons, while orders for pipe not specified as to sizes reached 4366 tons.

Similar figures for July production included 79,528 tons of pipe produced and 77,828 tons shipped. Orders under the classifications above aggregated respectively 16,839 tons, 183,130 tons and 4215 tons.

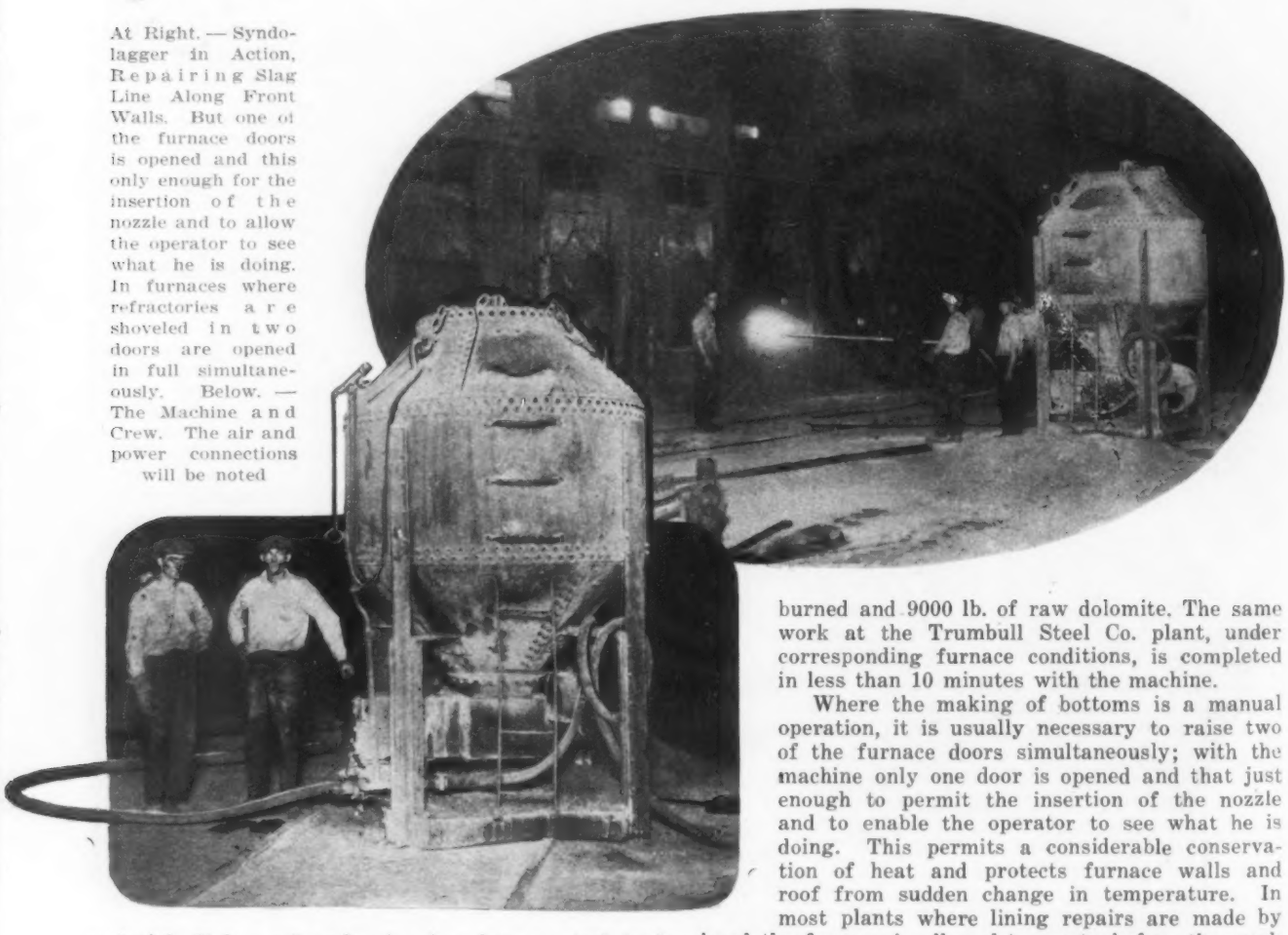
In both cases the great bulk (in number of pieces) consisted of 6-in. and 4-in. pipe, in that order, with 8-in. in third position; 12-in. and 10-in. pipe came next. These five sizes covered nearly 95 per cent of the number of pieces involved. The largest size listed was 72 in., of which seven pieces were called for in June and three in July.

MAKING OPEN-HEARTH BOTTOM

A Machine Which Economizes in Time and Materials

Without the labor-saving devices developed in the past two decades there could have been no such progress in the elimination of the 12-hr. day in the steel industry as already has been made. Not enough workers could have been found in so short a time to man a third shift in the continuous processes, had hand labor been employed in the old way. The charging machine for open-hearth furnaces, the skip hoist, pig-casting machine and bin system at blast furnaces have been fairly revolutionary. Among more recent developments in this category is the syndolagger, a mechanical device for making and repairing slag lines and bottoms of open-hearth furnaces.

The machine is operated by means of compressed air and a small electric motor. It conveys refractory material, ⅜-in. and under in size, from a steel tank through a 2½-in. hose and nozzle into the furnace and is sufficiently flexible to repair slag lines along the back wall, port ends and front wall, the latter being reached by use of a curved nozzle. It also may be used for repairing puddle holes in the bottom of the furnace. The Basic Products Co., Pittsburgh, holds the patents on the machine, which has been in operation in the plant of the Trumbull Steel Co., Warren, Ohio, for more than a year.



At Right. — Syndolagger in Action, Repairing Slag Line Along Front Walls. But one of the furnace doors is opened and this only enough for the insertion of the nozzle and to allow the operator to see what he is doing. In furnaces where refractories are shoveled in two doors are opened in full simultaneously. Below. — The Machine and Crew. The air and power connections will be noted

The illustration shows one of the two machines which have been in use at that plant. The tank has a capacity of 13,000 lb. of refractory material, which can be discharged at the rate of 500 lb. to 1500 lb. per minute. When the machine is put to use it is conveyed from the filling bins and placed in front of the furnace by the overhead crane serving the charging floor of the furnace department. The floor is provided with the necessary air and power connections and the setting up of the machine preparatory to use is a matter of a few minutes.

Repairing slag lines and bottoms of furnaces is one of the most arduous tasks of open-hearth workmen. In the average plant, having furnaces capable of producing from 75 to 125 tons a heat, from six to eight men are engaged in repairing furnace walls and bottoms after the tapping of each heat. If more than an hour elapses between the tapping and charging periods, the excess is referred to as "lost time." Such lost time generally is computed to be worth $1 a minute. Men who have the interest of their company at heart, or who realize that their bonus is based upon the steel produced, do not loaf, therefore, while furnaces are being prepared for an additional heat.

At the Trumbull Steel Co. plant, the average time between tapping and charging has been cut down from the arbitrary period of one hour to that of 30 minutes since the syndolagger was introduced. Frequently the elapsed time is less than 15 minutes. In a plant in the Pittsburgh district having furnaces of like capacity to those at Warren, Ohio, it takes seven men slightly over 30 minutes to make the necessary refractory repairs after each heat. They shovel in about 13,000 lb. of refractory material, including 4000 lb. of burned and 9000 lb. of raw dolomite. The same work at the Trumbull Steel Co. plant, under corresponding furnace conditions, is completed in less than 10 minutes with the machine.

Where the making of bottoms is a manual operation, it is usually necessary to raise two of the furnace doors simultaneously; with the machine only one door is opened and that just enough to permit the insertion of the nozzle and to enable the operator to see what he is doing. This permits a considerable conservation of heat and protects furnace walls and roof from sudden change in temperature. In most plants where lining repairs are made by hand the furnace is allowed to empty before the work begins; with the use of the machine, the front wall slag line is rebuilt while the steel is going into the ladle. With the use of the machine, none of the crew engaged in bottom making is exposed to direct heat for more than five minutes, while the shoveling method usually keeps the men in front of the furnace almost constantly for at least 30 minutes. The saving of man power is readily apparent.

The consumption of refractories at the Trumbull plant has been reduced appreciably by the use of the machine. A study of reports showing the consumption of lining materials at numerous open-hearth steel plants indicates that the Trumbull company is using less than half as much refractory material as some other plants of similar type employing burned and raw dolomite. At one Central Western steel works having 75-ton furnaces, where raw stone is used almost altogether, more than 100 lb. of raw stone per ton of steel is shoveled into the furnace after each heat, and in addition some synthetic material. While the initial cost of raw stone is low, two tons of

(*Concluded on page* 721)

Steel Foundries and Cooperative Research

Results Achieved Among Five Electric Plants in Operations, Costs and Merchandising—New Uses for Thin Castings

BY W. J. CORBETT*

IN the United States it is estimated that industries are spending $70,000,000 every year for research, and that the expenditure results in a saving of $500,000,000 annually to the country. This saving is enormous when compared with the amount expended for carrying on industrial research investigations.

Research investigations are not limited to a single company or corporation in an industry. Competitors with limited resources have begun to realize that great benefits can be derived by pooling their knowledge and experience for the purpose of conducting cooperative research work. Not so long ago, it was unheard of for competitors in an industry to get together and exchange opinions and results of their experience. Divulgence of these assumed trade secrets to competitors was thought to be a gift of some of the assets of those companies. Fortunately, such old-fashioned ideas have been cast aside, and it is probably safe to assume that the most progressive and broad-minded industrialists and business men are always willing to exchange ideas with one another even though they be competitors.

Some of the direct results to be obtained by research and cooperation in industry may be said to be the following:

1. Decreased costs of production and elimination of waste.
2. Improvement of present processes and products and development of new processes and products.
3. Standardization of manufacturing operations, quality of products and methods of analysis and control.
4. Development of new uses for known products.
5. Development of efficient merchandising methods.

It does not require a very vivid imagination to realize that some or all of the above results should be the outcome of well directed cooperative research investigations in an industry.

[The author gives here an account of the formation and operation of the Electric Steel Founders' Research Group, familiar to most readers of THE IRON AGE.]

Technical Cooperation and Research

Inspection Standards.—One of the first steps taken by the Electric Steel Founders' Research Group was to establish inspection standards which are uniform for all the five companies. These standards are much more rigid than those included in any commercial specifications at the present time. Upon the adoption of these inspection standards, each company in the group increased its inspection personnel or installed an inspection department in order that there would be strict observance of the inspection standards. The inspection department at each plant is indirectly under the supervision of the research director of the group, and the latter scrutinizes carefully the inspection methods during his periodic visits to the plants in order to ascertain if the quality of the castings is being maintained. The ultimate object aimed at by this procedure is the elimination of extra finishing and cleaning and delays in assembling castings at plants of customers, by shipping to them castings that are clean and true to pattern.

Sand for Cores.—Research investigations on molding sand and core sand mixtures at Sivyer Steel Casting Co., Milwaukee, Wis., and at Fort Pitt Steel Casting Co., McKeesport, Pa., have furnished valuable data for practical use in the production of small steel castings having thin sections. The sand used in a steel foundry making castings of intricate design and having thin sections of metal must have the most exacting refractory qualities if clean castings are to be produced. It is necessary that the surface of the sand molds be able to withstand the tendency to fuse to the castings caused by the exceedingly high temperature of steel from the electric furnace. The sand must also have certain physical properties to prevent the formation of blow-holes in the castings. Definite information has been obtained from the experiments on molding and core sand mixtures, concerning the character of the raw sand, the method of mixing the sand in the foundry, the amount of moisture allowed, the ingredients to be used for giving bond to the sand mixture so that it can be molded, and the daily analysis and control of the sand mixtures in the shop.

Heat Treatment.—Extensive experiments performed under ordinary shop conditions at Michigan Steel Casting Co., Detroit, Mich., on the heat treatment of steel castings have conclusively determined the best practice to follow. The heat treatment of steel castings is a very important subject and consumers are beginning to recognize this. Proper heat treatment methods must be used in a steel foundry if the product is to have the best physical properties. The experiments on this subject have furnished such essential data as the temperature for annealing, the soaking time, and the method of cooling from the maximum temperature.

Slag and Aluminum.—The prevention of the presence of slag in steel castings is of great importance. Investigations made at Lebanon Steel Foundry, Lebanon, Pa., on slag in castings, have enabled the foundries in the group to adopt methods which reduce to a minimum the evil of occlûded slag in steel castings.

Research investigations on the use of aluminum in making steel castings, have resulted in the conclusion that there is a definite maximum amount of aluminum per ton of steel that may be used without having deleterious effects on the ductility of the steel. The investigations of the group have proved that aluminum has no effect on the physical properties of steel castings if a certain amount per ton of steel is not exceeded. The use of an amount in excess of this maximum has a very pronounced bad effect on the physical properties of steel.

Cooperation in Cost Accounting

In the survey of about 30,000 manufacturing establishments in the United States by the Federal Trade Commission, it was found that only 10 per cent had an adequate knowledge of costs. This was an astonishing situation and has been corrected to some extent by the activities of various bodies. The Federal Trade Commission, United States Chamber of Commerce, manufacturers' associations, cost associations, the Interstate Commerce Commission, and the establishment of the Federal Income Tax, have all been influential in causing business men to adopt methods of accounting which provide useful cost data for the formulation of policies.

It is not uncommon for some companies to have an elaborate monthly cost summary, and make no use of the data in it for determining the cost of specific articles which they produce. It is merely an average cost for all articles produced during the month, and it gives no indication whatever of the cost of an individual product when a number of different articles are made. For example, in a steel foundry, the total average cost for a month might be $300 per ton of good castings produced, and included in this average there would

(*Concluded on page* 731)

*Abstract of a paper read before the Industrial Cost Association in Pittsburgh at its June meeting. The author is industrial engineer of the Electric Steel Founders' Research Group.

PAY FOR TEN HOURS RAISED

Adjustment Similar to That of Men Reduced to Eight Hours Announced

Judge Elbert H. Gary, chairman United States Steel Corporation, and Eugene G. Grace, president Bethlehem Steel Corporation, on Sept. 7 issued statements in regard to the progress being made in overcoming the problems which have arisen in the steel industry as a result of elimination of the 12-hr. day. Judge Gary said that "existing conditions will not permit a general increase of wage rates" but he points out that the men whose hours of work have been reduced from 12 to 10 hours a day will receive an increase in wages equal to 10 per cent of the hourly rate. Those men whose hours were reduced from 12 to 8 received an increase of 25 per cent. Judge Gary's statement said:

"At the time the directors of the American Iron and Steel Institute publicly stated that total elimination of the 12-hr. day would be immediately commenced it was said that employees connected with continuous process would be reduced from 12 to 8 hours and that their wage rates would be so adjusted as to afford earnings equivalent to a 25 per cent increase in hourly and base rates; also that all other workmen would be on 10 hr. or less and their present hourly and base rates would be continued, though whenever it should be practicable, by promotions or changes in position, daily earnings would be accordingly adjusted.

"Since that time the industry has proceeded as rapidly as possible to bring about changes of hours and also to make such changes in position and otherwise as would permit equitable adjustments in regard to the 10-hr. men. However, as time has elapsed, it appears that there is a larger number of 12-hr. men reduced from 12 hr., not connected with continuous process, than it was then expected. Consequently, there is now a considerable number of 10-hr. men, some of whom formerly worked 12 hr. and others on a straight 10-hr. day basis, and it seems to the employers that there should promptly be made adjustments in regard to the wages of these workmen.

"Existing conditions will not permit a general increase of wage rates. The adjustments which have been and are being made, as suggested, arise entirely from the circumstances growing out of the total elimination of the 12-hr. day."

President Grace said that "substantial progress has been made in the elimination of the 12-hr. day in the company's steel plants. The rearrangement of forces and working conditions has proceeded very satisfactorily," he added, "and the problems involved in transferring employees from 12 to 10 hr. are being adjusted, as in the case of the workers transferred from 12 to 8 hr., on an individual basis, the company sharing with the employees the loss in their daily earnings."

Under new arrangement the men who have been working 10 hr. will receive the equivalent of 11 hr. pay at the rate of 40c. an hour, bringing their daily wage from $4 up to $4.40.

Plant Operations at Philadelphia

Almost all of the iron and metal-working plants at Philadelphia are running at close to normal capacity, with employment of full working forces, while the turn of September has brought an overtime schedule in a number of factories. At the works of Henry Disston & Sons, Inc., Tacony, maximum production is being maintained in the saw and file manufacturing departments, while a night shift has been adopted in several plant divisions. The Electric Storage Battery Co. is running full at its main Philadelphia plant for the manufacture of batteries for automobile, radio and other service, and some departments have been placed on an overtime basis; at its new Crescentville works production is going forward to the maximum extent of machinery now installed, and it is expected to advance the operating schedule just as soon as other equipment is in place. Orders on hand and incoming business insure the present production basis well into the coming year. A total of 4000 persons is now on the payroll.

The William Cramp & Sons Ship & Engine Building Co. is operating at capacity in its hydroelectric machinery department, known as the Morris Works. The J. G. Brill Co., manufacturer of cars and trucks, is running at slightly over 80 per cent of capacity, with indications for an increase in the near future. The Baldwin Locomotive Works has adopted a capacity schedule, giving employment to about 21,000; it is expected to hold to this basis till well after the turn of the year, with present trend making curtailment very indefinite. At Camden, N. J., the New York Shipbuilding Co. is developing heavy production in its structural steel department, with incoming orders insuring the present rate of output for several months. The Victor Talking Machine Co. has adopted the largest production schedule in its history. A new plant addition costing close to $1,000,000 will be placed in service at once.

Coke By-Products in 1922

The Department of the Interior makes public the final statistical results of the Geological Survey's canvass of the coke industry in 1922. Preliminary estimates of the production of coke made in February were substantiated by the final returns from the producers. These returns show a total output of 37,124,012 net tons of coke, comprising 28,550,545 tons of by-product coke and 8,573,467 tons of beehive coke. Except 1921, when business was extremely depressed, each year since 1911 has witnessed a larger total output of coke than 1922. The production of beehive coke was the smallest since 1888, except that in 1921. The output of by-product coke, however, was the largest recorded since the beginning of the industry, except only that in 1920. As compared with 1920, the last normal year, 1922 showed decreases of 29 per cent in the total production of coke, 8 per cent in by-product coke, and 58 per cent in beehive coke.

By-product coke continued to exceed beehive coke in quantity, as it has since 1918. Only 23 per cent of the total came from beehive ovens in 1922, against 22 per cent in 1921 and 40 per cent in 1920.

Salient Figures of the Coke Industry in 1922

Ovens:	Beehive	By-product	Total
In existence Dec. 31, 1922	63,957	11,212	75,169
Daily capacity (net tons of coke)	107,418	119,898	227,316
Coal charged into ovens (net tons)	13,285,868	41,052,670	54,338,538
Value of coal charged into ovens	$35,082,804	$194,015,725	$229,098,529
Coke produced (net tons)	8,573,467	28,550,545	37,124,012
Value of coke produced	$50,036,556	$188,276,767	$238,313,323
Average yield of coke from coal (per cent)	64.5	69.5	68.3
Coke used by producer (net tons)	1,071,886	21,106,823	22,178,709
Furnace coke sold (net tons)	6,105,003	2,934,924	9,039,927
Value of furnace coke sold	$33,724,440	$20,636,494	$54,360,934
Foundry coke sold (net tons)	1,164,716	1,601,733	2,766,449
Value of foundry coke sold	$8,334,400	$15,921,431	$24,255,831
Domestic and other coke sold (net tons)	179,670	3,865,751	4,045,421
Value of domestic and other coke sold	$1,086,014	$34,407,054	$35,493,068
Screenings and breeze: Produced (net tons)	83,917	2,395,286	2,479,203
Sold: Quantity (net tons)	41,533	526,157	567,690
Value	$132,448	$1,583,399	$1,715,847

Sale of Battleships and Battle Cruisers to Be Scrapped by Treaty Agreement

The Navy Department announces that 21 battleships and battle cruisers to be eliminated from the United States Navy, in accordance with terms of the Treaty for the Limitation of Armament, will be sold for salvage, under sealed proposals, each ship to be sold as a whole and to be scrapped by the purchaser within 18 months from the date of ratification of the treaty, which became effective Aug. 17, 1923. Details of the plans of the Navy were given in THE IRON AGE of Aug. 23, page 497.

Tool Making in Cash Register Manufacture*

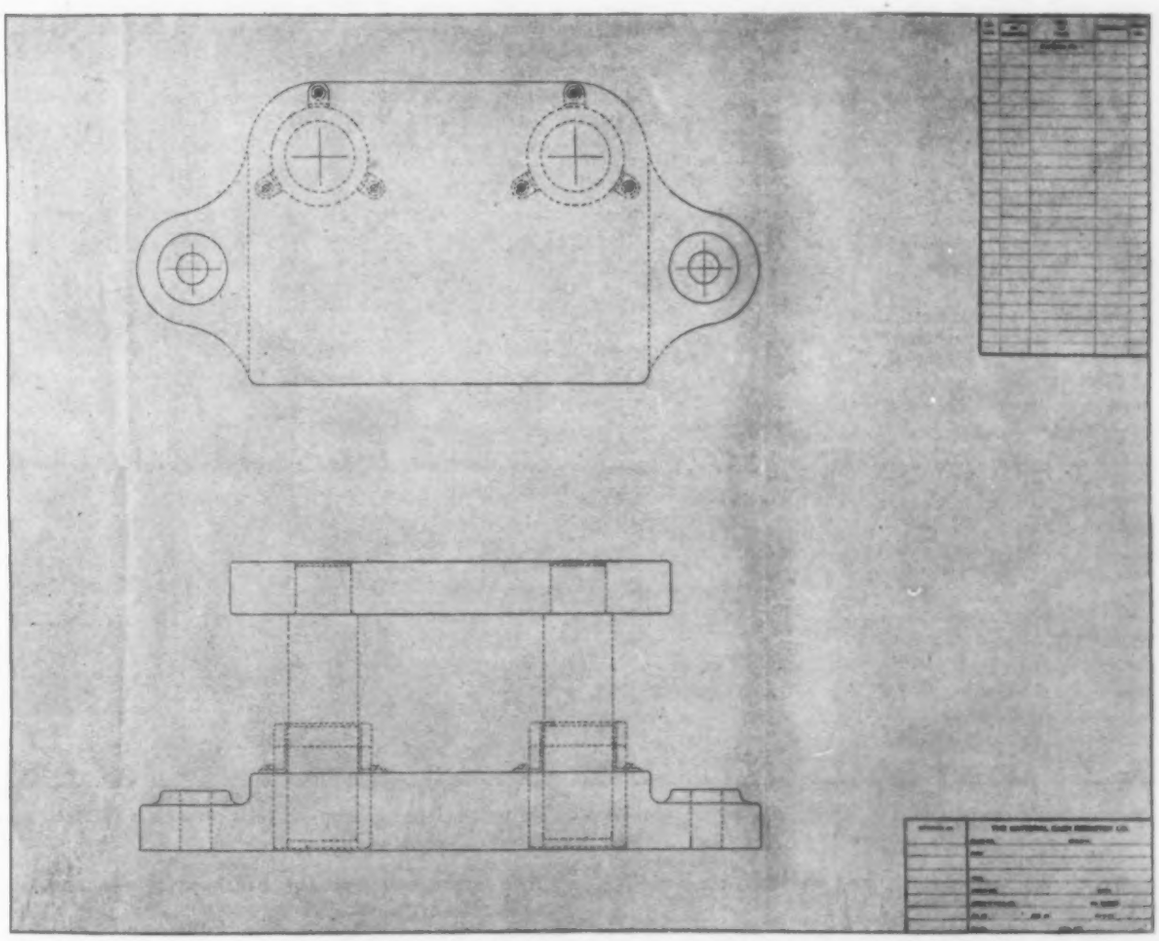
Stock Designs and Stocks of Standardized Parts—Tool Room Operators Specialists—Factory Telephones and Messengers—Master Gages Furnished Workmen

IN connection with the design of tools, the National Cash Register Co. has worked out an exceptionally effective method of saving time for the tool designer and the labor of actually making drawings. Standard tool design books are available for the use of the designer to assist him in working out his problem of fitting the tools to do the required work. With these standard designs as a guide he can more quickly arrive at a practical design, although strict adherence to standard design is not imperative.

In the making of designs for tools a distinct schedule is adhered to. The improvement number of the part to be tooled is listed and a due date registered for completion of the design. This date is arrived at by estimating the number of hours required for designing the tools and the number of men available who are familiar with that particular class of work. Effort is made to have the due date for tools correspond with the arrival of stock in the factory.

To assist in the mechanical part of tool designing, many time-saving features have been adopted. The common run of work is drawn direct on vellum, requiring no tracing nor duplication of effort. Standard instructions such as "harden and grind" are put in the drawing with a rubber stamp, instead of requiring the draftsman's time to print in. Special machine designs and the more important work are traced in ink on regular tracing cloth.

Many parts are standardized and drawing printed on vellum, requiring only the filling in of dimensions. Some of these are automatic screw machine cams, graduated, requiring outlining of the cam and insertion of dimensions; punch holders and die shoes of different sizes; automatic screw machine cutting off and forming tools; jig bodies and parts. Standards are maintained on jig patterns, lids, lid stops, feet, posts and lid thumb screws, hinges and hinge pins, fixture plates and angle plates, stops, clamps, bushings, and indicator bases for dial indicators. These parts are all carried as standard designs, so that all the designer has to do is select, for instance, the proper size jig body, lay out the holes for standard bushings, select the proper hinge parts, lid stops, etc., and fill in dimensions.



Tool Designing is so Systematized That Certain Types of Tools and Fixtures are Printed in Outline on Vellum, Requiring Only the Insertion of Dimensions or Minor Detail to Produce a Finished Drawing Ready for Blue Printing. Punch holders and die shoe designs are available in a number of different sizes

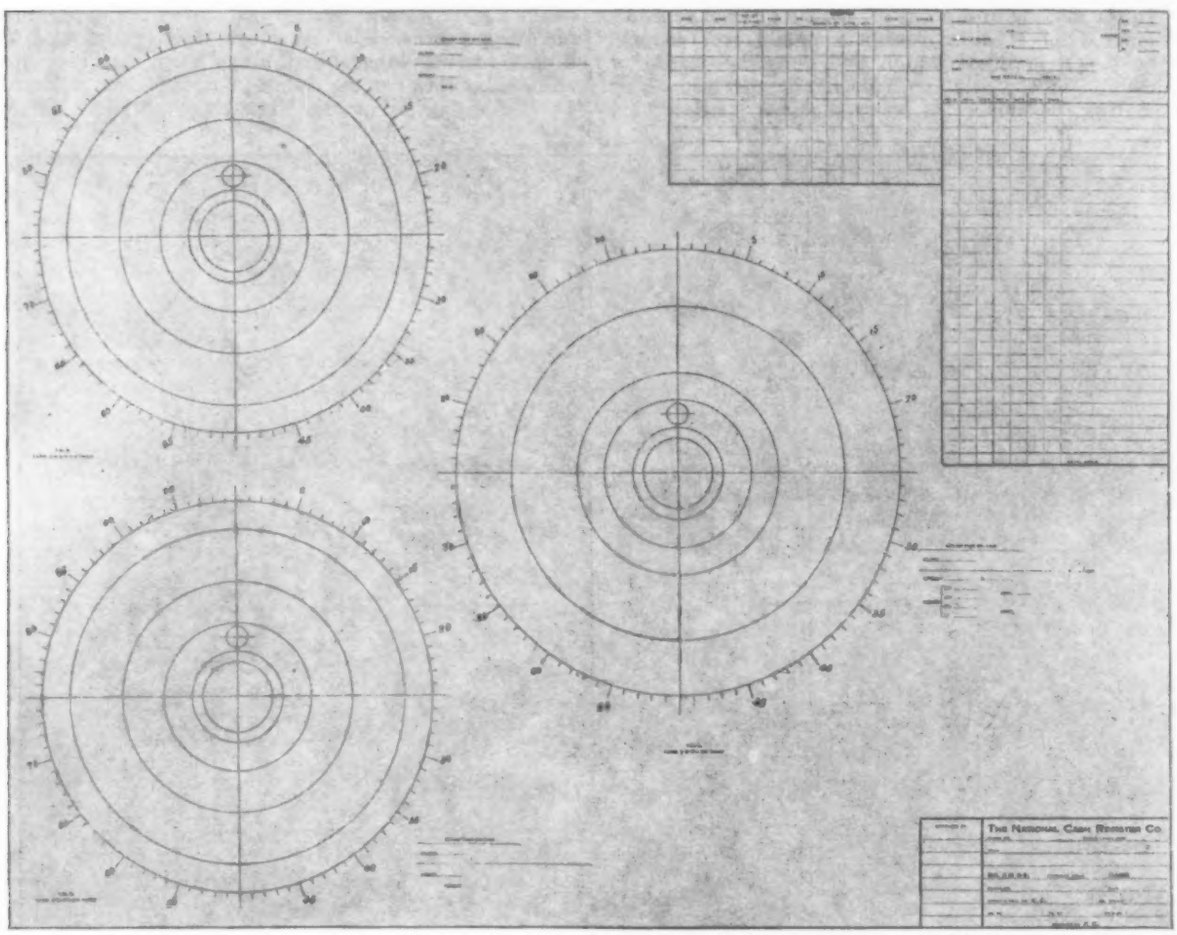
In the case of special fixtures standard clamps and jacks or stops are used. A sample is the knife edge clamp for profile fixtures or for holding any work of a thin nature. A very interesting stop or jack to support thin work while being machined has been evolved at this plant. It consists of a hardened pin operating vertically in a hardened bushing by means of a wedge sliding beneath it. The final design evolved after a number of trials is dust protected. This jack

*Continuation of a comprehensive article by L. S. Love, begun on page 531 of the issue of Aug. 30, giving in unusual detail methods followed in the making and maintenance of machinery and tools for manufacturing products requiring metal cutting and other operations.

is now the standard support stop used in all special or large machining fixtures. This evolution is shown in the accompanying drawings.

Another point on which standardization has been carried through is the making of interchangeable vise jaws of different forms. In other words even the tool designing in this plant is standardized on a production basis with tests and checks along the line to assure correctness.

The largest section of the tool making division is devoted to the producing of jigs, fixtures, punches and dies, and gages. In this department at the present time there are employed 260 men, although it has a capacity for accommodating about 280 men. Repairs and changes on punches, dies, jigs, and fixtures, etc., are also taken care of in this particular section. There are 41 employees of the department devoted to that particular class of repair work. The employees are divided into sections devoted to machining, to new punch and die work, to punch and die repairs, to new jig, fixture and gage work, and the repairing of jigs, fixtures and gages.



Automatic Screw Machine Cams Printed on Vellum Require Only the Cam Outline and Dimensions to Effect a Complete Drawing

About 60 per cent of the work of this section is on punch and die making. Reference has been made in a description of the work of the tool design division to the standardized jig bodies, fixture parts, punch holders and die shoes, of which there are approximately 180 parts carried in stock in the stock room of this section. This stock includes punch holders and die shoes of different sizes, jig bodies of different sizes, parts for jig bodies including hinges, hinge pins, hinge bushings, lids, lid stops, drill bushings, common wing nuts and ball wing nuts, knurled thumb screws, and other clamping devices for jigs and fixtures. There are also carried in stock guide pins for die assembly as well as standardized vise jaws.

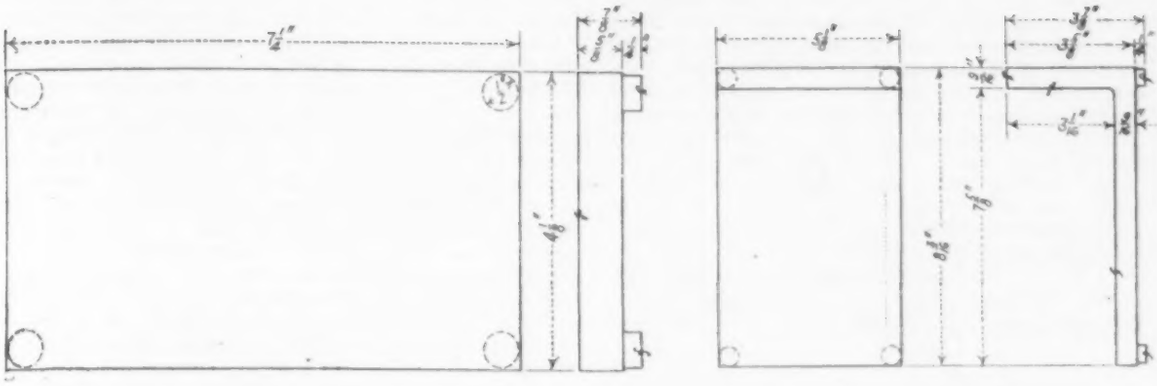
This section is run on a production basis and the employees are specialists on the particular class of work in which they are engaged. They are not the usual type of all-round tool makers, it having been found that specialization in the tool room pays as it does in the production shop. In the machining division of this section, the allotment of machinery averages about 1¼ machines per man, whereas in the ordinary tool shop the average is 1 machine per man. This may look like excess of equipment, but it is not, being compensated for by the fact that when a man is ready for his machine he has a machine at his disposal at practically any time he may be ready for it, and there are no enforced delays.

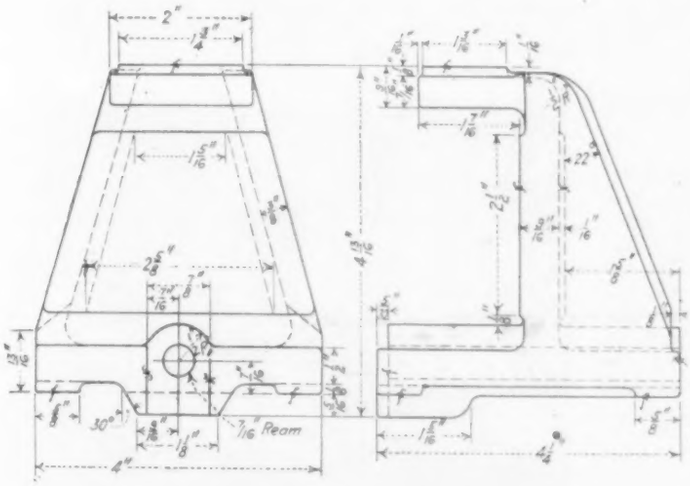
When a design with details is received covering a fixture or die set which is to be made, materials for it are ordered by the stock order department. This includes the ordering of patterns, castings, forgings, acetylene welding, or any special work which may be required. Further, all supplementary orders for material or work are issued by that department against the particular tool order number.

When the raw material enters this section, it goes to the machine division, where no work is done on it which might handicap the bench man. The machine operator is required to remove enough of the surplus metal, thereby not leaving more than the bench man can conveniently remove in his finishing operation to produce an accurate job in a minimum of time.

Material ordered for a particular tool order is held in the material stock room and a separate requisition for the stock is issued for it as the workman is ready for it. This avoids having material charged to the tool order number before it is ready to go into processing. Were the material all drawn at once and should the order be held up for some reason or other, a large quantity of material not in process would be piling up on various orders and crowding the department.

For convenience in maintenance work or the repairs of jigs, fixtures, etc., which have been damaged or worn in the production department, a large stock of finished tool steel is carried. This avoids loss of time required for machining such tool steel to sizes required





Typical Fixture Plates (above left) Angle Plates (above right) and Cast Iron Jig Bodies (left) are Used in Designing Fixtures and Are Carried in Stock in the Tool Making Department. A variety of sizes of jig bodies (below) are standardized to assist the tool designer in designing suitable fixtures for machine operations. Such standard parts are carried in great variety, classified in different groups. Slip bushings are made in 26 styles, each style having a number of sizes; one for instance has 124. These bushings are carried for purposes of ready replacement in the departments using them, as indicated by a schedule

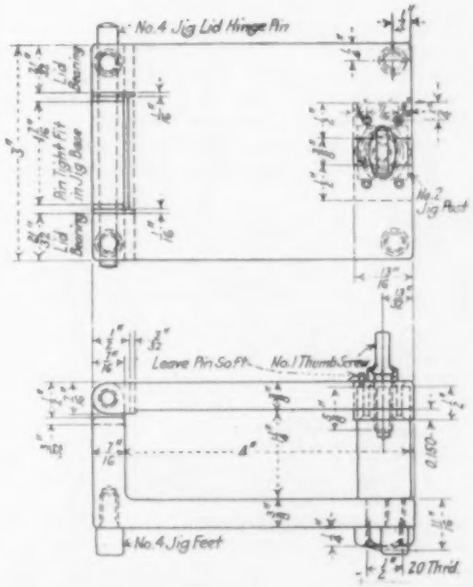
as the finished size can be drawn from stock, it simply being necessary to cut the piece to length required.

Some of the methods employed in handling work in this department will be of value to those interested in the producing of this class of tools. In the majority of cases work is delivered back and forth between workmen by messengers of whom there are four employed in this department. The system is by an annunciator, the workman having at his bench a push button to call a messenger, signifying that he has finished with one job and is ready for another.

All time tickets are carried in a central office as is the case in the small tool division and the same sort of telephone system is employed. A man reports in when he starts on a job and that job is carried along against his time until he reports starting on a new job. The switchboard on this telephone has 20 instruments which will indicate the thought devoted to this layout toward saving of the time of the workman in non-productive effort. Time tickets are written at the central office in duplicate. The duplicate is filed with the original order so that attached to the order is first hand information instead of depending on a transcribed record.

The company has devoted a great deal of attention to the progress in shaving dies, which are made by this particular section of the tool making division. These shaving dies are used for finishing of cams, ratchets, racks, etc., after blanking from sheet stock, the work being held to very close limits. This method saves considerable in the expense of production as compared with milling on the same class of work, the finished product being as accurate as a milled job.

To assist the bench hand in finishing dies, there has been developed for use of this department a bench filing stand. These stands employ a common type of motor-driven bench filing machine, but instead of the filing machine being mounted on a standard work bench and the hand sitting on an ordinary stool, the filing machine is mounted on a structural frame on which is also mounted the seat for the hand doing the filing. This arrangement permits the die to be pushed against the file without having the stool on which



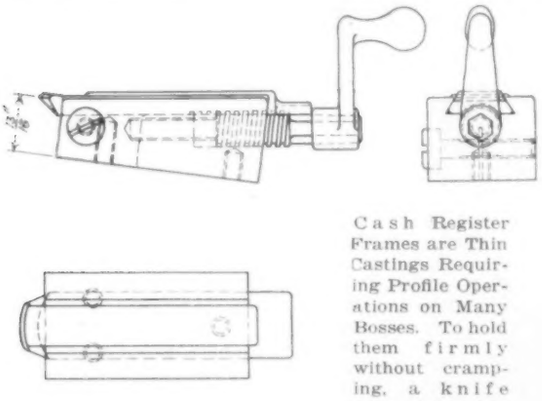
the operator sits pushed away from the bench. There are 18 of these stands in use in the department and they have proved very satisfactory in operation.

There are very few special machines employed in this section, although several unusual machine operations are noticeable for their use on work of this nature. Much of the work is handled on screw machines. Practically all cast iron die shoes, etc., are milled in vertical milling machines, planers being very little used in this shop. In this milling work shoes are finished with cuts wider than the spread of the cutter, which is contrary to ordinary milling practice on accurate work, but this company has been able to produce work of this kind with absolutely matched cuts.

One special machine has been designed and built by the company for use of this department. This is a portable boring head for bench use. It is employed

in connection with a jig or fixture for line boring or reaming and has saved considerable time on this class of work, although not suitable for drilling operations.

Naturally it is necessary for punches, dies, etc., to be hardened. It was formerly the practice to have hardening furnaces for use of the various bench

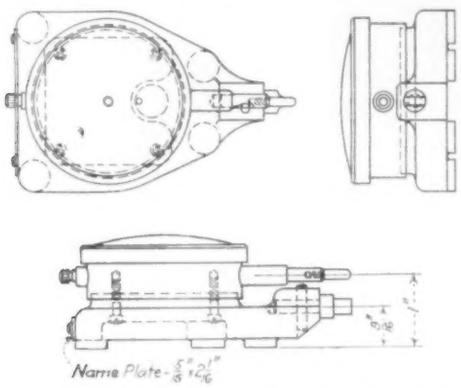


Cash Register Frames are Thin Castings Requiring Profile Operations on Many Bosses. To hold them firmly without cramping, a knife edge clamp has been developed

workers to harden dies on which they were working. The company found that with this method there was little uniformity in the hardening of dies and there was excess breakage and wear due to this non-uniformity, shrinkage cracks, etc. All hardening is now done in a central heat-treating department and this change has reduced repairs due to breakage to less than 2 per cent. Tempering on small parts is done in an electric furnace which can be set for the temperature desired and holds at that temperature.

The method employed in making knurled-head screws, referred to above as carried in stock, is interesting, in that it saves time and material. These knurled heads are turned out from the bar in screw machines. The screws are threaded into them and riveted over, thereby making an absolutely rigid unit of the two pieces and effecting a considerable saving.

The practice of carrying parts in stock has shown that it not only is a time-saving feature in the making of fixtures, etc., but is also most valuable in the time that it saves in repairing jigs which are needed in production work. Twenty-three sizes of jig feet,



Many of the Parts Machined in Fixtures of Various Kinds Are Tested for Accuracy at Frequent Intervals During the Run of a Lot. For this purpose dial indicators are used. These are mounted on bases made for the purpose to be used in conjunction with testing fixtures

hardened and ground taper pins, etc., assist materially in saving time on such repairs.

This department carries about $750,000 worth of master or reference plates for drill jigs, etc., in order that a constant check may be maintained on work of this nature. One unusual thing noted is the fact that Johannson gage blocks are found on various work benches, the policy of the company being that where accuracy is required it is more economical to permit men to use accurate gages rather than to keep them locked in a vault and give the men substitutes. The beneficial results of this practice are shown particularly in the accuracy with which the shaving dies are made. These must check absolutely in a location gage. Some shaving dies are used on rack work and the rack portion of the die is not ground, depending entirely upon the accuracy of the work assisted by accurate gages. This section also manufactures die casting dies, which are used by the company for such die castings as are required in the product. One unusual operation noted here was the making of a die for a class of upset punching of a sheet steel blank, thereby widening one edge in which a rack is later machined.

All dies and tools made here are carefully checked and inspected, the inspection being under the supervision of the main inspection department. To assist in this work the company made a surface plate which is larger than any on the market, having a surface of 48 x 64 in. It is mounted with a three-point bearing in a frame which rolls on swiveling type ball bearing casters. This surface plate, before being put into use, was subjected to an intensive seasoning process, thereby assuring maintenance of accuracy. After inspection

It Was Found Impossible to Purchase a Surface Plate Large Enough for the Needs of the Tool Making Department, so One was Made. It has three point suspension on a pipe frame mounted on ball bearing casters

of tools, dies, etc., they are all tried out before being forwarded to the production division for actual use.

Some of the duties of the stock order department, to which reference has been made several times, might properly be inserted at this point. The duties of this department require it to order and maintain a supply of raw materials through orders given to the purchasing department. A perpetual inventory is maintained, using a system of replacement with a maximum and minimum figure based on the period of delivery. They do not order the season's requirements at any one time. An established limit is set and orders are placed throughout the year, depending on sales. About 7900 items are carried on the records of this department, covering over 37,000 parts made in the plant.

This department issues production orders for stock on the factory, according to routing by the inspection department, all of which has been mentioned in the description of the various tool making processes. A record is kept by travel or stock card covering every box or receptacle in the plant. A tracer record is maintained in which are posted labor tickets, showing work done and a complete record of a job is posted within four hours after work is performed. This covers every box, item, name of part, number of part, etc. Another

important duty of this department is to send each day to each department of the production division a list of items that are required by the assembly division.

Before proceeding to a description of the departments devoted to the making of special cutters and tools designed in the tool design division, a brief explanation of the duties of the general machine shop might be in order, as it is located adjacent to the cutter or small tool department. This section employs 95 men in maintenance of machines throughout the plant and also in building special machines designed by the efficiency engineering department.

It is hard to form a conception of the number and variety of small tools made in a plant essentially devoted to the production of some other article. However, in the small tool division of the N. C. R. there are some 106,000 tools made annually from 20,000 drawings. These tools cover cutters, reamers, drills, arbors, broaches, counterbores, form cutters, milling cutters, knurls, laps, screw machine tools, taps, dies and wrenches used in all departments of the factory. The department employs 63 men.

The method of handling the work is of interest. Each job is handled in an individual metal box which is numbered; this number is carried on the card showing the shop order number so that each job can be traced by its container. A telephone system, which by the way is a part of the company's product, is used for keeping time on each job. As the tool maker receives a job at the material bench, he telephones to the shop office that he is starting on such and such an order number. His time is carried against that job until he reports in as starting on another order. In other words the waste of time for reporting that a job is completed is eliminated, the clerk automatically checking a completed operation on one order when the man reports he is starting on another.

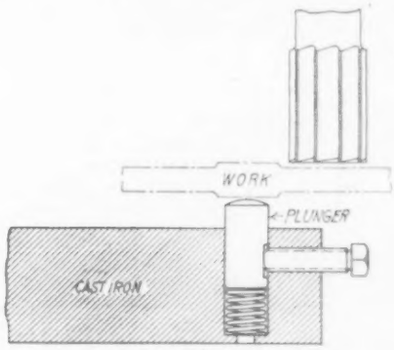
Various classes of work, due to the arrangement of machines, can be routed around the shop starting at the right. In other words, at the right of the shop are screw machines, lathes, etc., for turning or preparing the blanks, before they go to succeeding operations of fluting, threading, etc. After each operation the box with the lot of tools is turned in for inspection before the next operation.

In this department are several special types of machines. One is a relieving machine designed and built by the company years ago. This machine in general appearance resembles a relieving lathe, except that the relieving mechanism is different from the more common form producing a steadier motion which does not deliver the blow or shock of the ordinary machine.

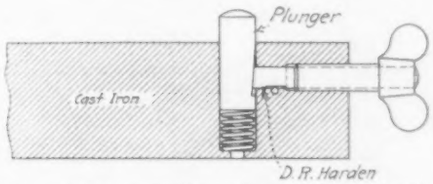
A special machine designed and built by the company is used for making the steel knurling dies for knurling figures on counter wheels. The cutter is set with a dial mechanism. Master characters for engraving machines described in another section are also made here. Special machines designed and built by the National Cash Register Co. are used for grinding screw machine tools, holding work within 0.0002 in.

This department also on occasion must grind rubber. The machine on which this is done is provided with a hood practically surrounding the wheel and work from which the dust is exhausted.

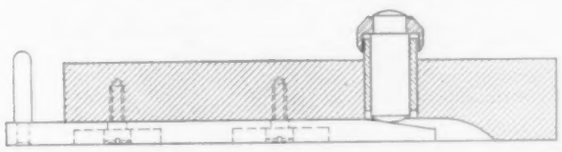
To show the care exercised in this tool shop mention is made of the fact that the clearance on reamers is honed with an oilstone. Also every form cutter is honed to shut out light between itself and the master form. All tools are tried before delivery to the production shop.



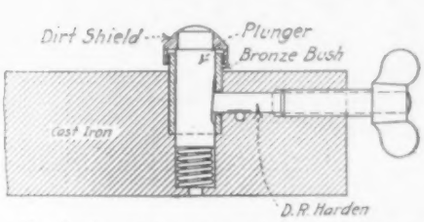
No. 1—Slipped and Clogged with Dirt



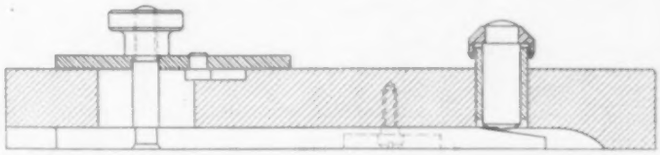
No. 2—Shifted in Tightening and Clogged with Dirt



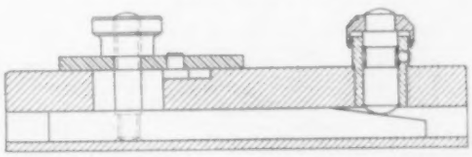
No. 4—Wedge Slipped Back



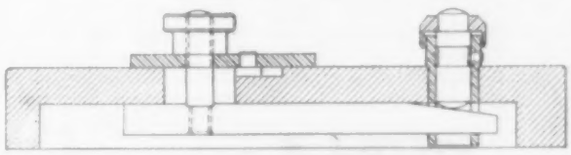
No. 3—Somewhat Dirt-Proof But Shifted in Tightening



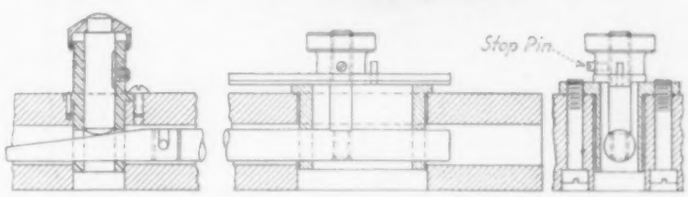
No. 5—Anti-Slipper Added but Would Spring Due to Unevenness of Platen



No. 6—Too Much Friction, Hence Not Sensitive



No. 7—More Sensitive Than No. 6



No. 8—Present Model in Use

Evolution of the Adjustable Wedge Stop or Jack Largely Used to Support Thin Castings While Being Profiled, but Also Useful in Other Machining Operations. Objections in the various designs shown in this development are given under each sketch

(To be continued)

Sheet Sales and Production Analyzed*

Comparable Trend Charts as an Aid in Determining the Relations of Inventories, Production and Shipments

BY W. HERMAN GREUL†

THE way in which sheet steel manufacturers have handled inventories and production schedules furnishes an interesting contrast to the control of these factors by the merchant pig iron producers described in a previous article. (Aug. 2, p. 255). Statistics collected by the National Association of Sheet and Tin Plate Manufacturers and published in the Department of Commerce in its *Survey*, afford the data

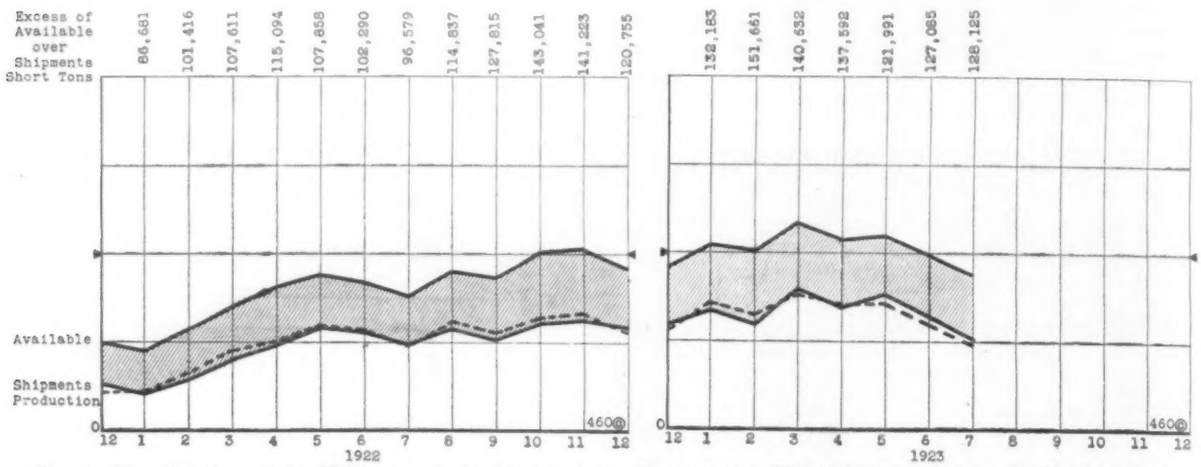


Fig. 1—The Relation of the Thickness of the Shaded Area (Representing Finished Inventory) to the Height of the Shipment Line Shows Conservative Production Policies

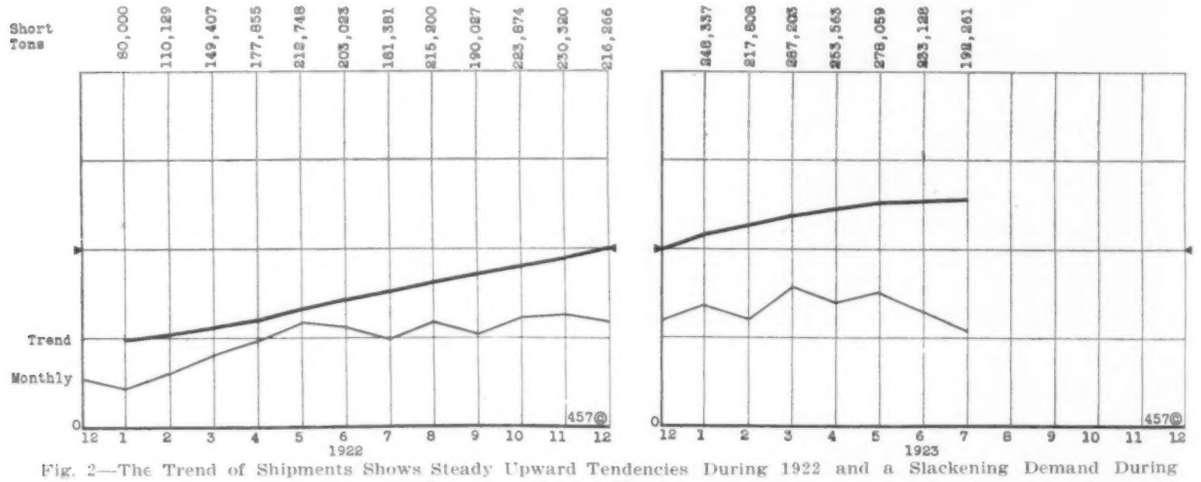


Fig. 2—The Trend of Shipments Shows Steady Upward Tendencies During 1922 and a Slackening Demand During Recent Months

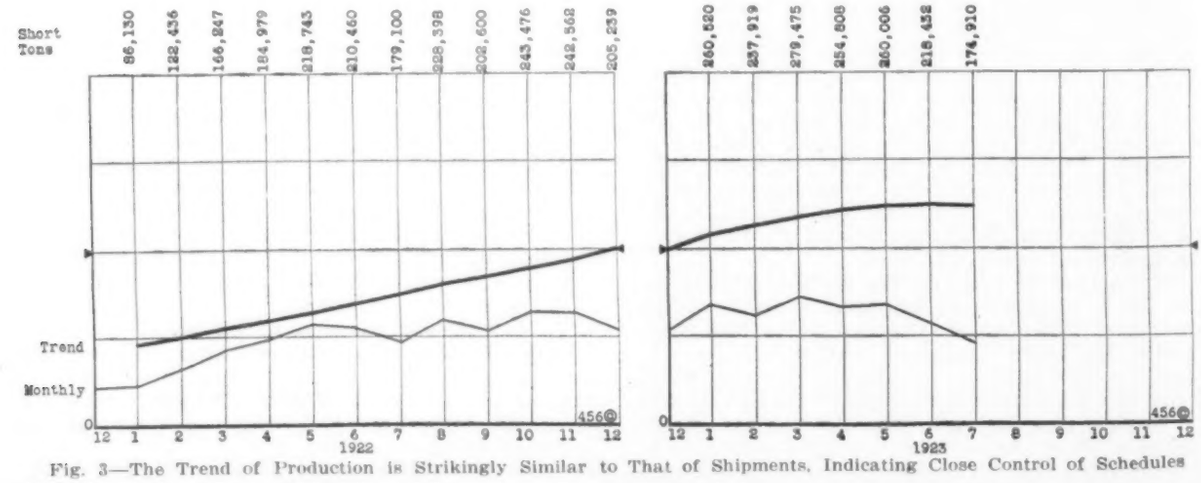


Fig. 3—The Trend of Production is Strikingly Similar to That of Shipments, Indicating Close Control of Schedules

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†Consultant in analysis of business operations, New York

for making the comparisons. These comparisons are facilitated by use of the standardized trend charts similar to those previously described.

Fig. 1 gives the relation between production, shipments and total stocks of association members, covering approximately 70 per cent of the country's output of sheets and fairly representative of the industry. The shaded area in this chart indicates by its varying thickness the tonnage of stocks in excess of shipping

It will also be noted that the fluctuation of production from month to month (thin line) is much less than in the case of the pig iron.

Fig. 4, picturing the fluctuation and trend of sales, shows the influence of advance bookings by the peaks of March, June and December, 1922, and March, 1923, in the monthly curve (thin line) and this is also reflected in the irregularity of the trend line. While these peaks synchronize with those of merchant pig

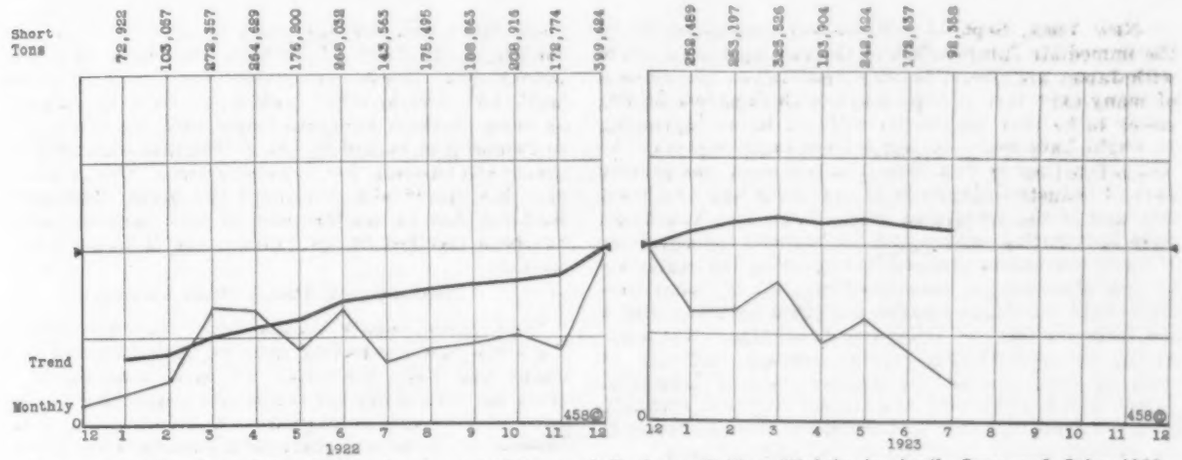


Fig. 4—The Trend of Sales Shows the Annual Volume of Business Falling Slightly in April, June and July, 1922

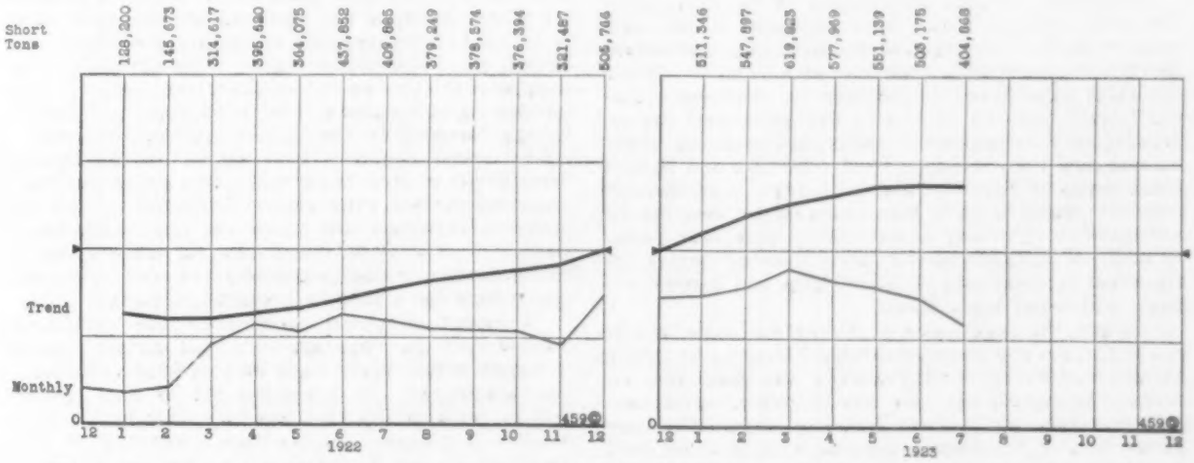


Fig. 5—The Trend of Unfilled Orders May Be Compared With Shipments, Production and Sales, Figs. 2, 3 and 4

demands. Comparison of this thickness with the height of the first horizontal ruling above the zero base line (representing average monthly shipments in 1922) shows that during the 20 months covered by the chart, this inventory is always less than one month's average requirements. Comparison of this thickness with the height of the shipments line shows that only in one month, January, 1922, is it equal to the current month's demand, that during 1923 this excess stock ranged around a half of the current monthly requirements up to June, and at the end of July the fall in shipments increased this ratio to about eight-tenths. It will be noted also that monthly production has followed very close to monthly shipments throughout the entire period. The first horizontal ruling of the chart above zero is made to be equal to the monthly average of shipments for the calendar year 1922.

Figs. 2 and 3, showing the trends, respectively, of shipments and production, emphasize by the similarity of the slopes of the lines, the close coordination of these two factors. The trend of shipments of sheets during the current year is very similar to the trend of merchant pig iron shipments but there is a striking contrast between the trends of production in the two fields of manufacture. Sheet manufacturers have held their production trend practically parallel to shipping demand while pig iron producers kept pushing up production when there was a flattening out of demand. iron sales, they are relatively much smaller in magnitude.

A useful characteristic of the trend lines of these charts is their quick reflection of the relation of the current month to the corresponding month of the preceding year. When the trend line moves upward for any month it indicates that the value of the subject pictured is greater than it was in the corresponding month of the previous year and vice versa. Notice in Fig. 4 that the trend line dips in April, June and July of this year indicating lower volume of sales than for corresponding months in 1922. All other months show increases. Confirmation of this is found by comparison of the heights of the monthly line for like periods or by comparison of the figures at the top of the diagram which give the actual values in tons.

The trend of unfilled orders, Fig. 5, was steadily upward from February, 1922, with an increase in the rate of its growth from last November to February of this year, when the rate gradually decreases until in July it is practically stationary and may be expected to decrease in succeeding months in view of the downward tendency of sales and the continued though slight upward trend of shipments.

The series of charts taken together indicate a steady, conservative progress in the industry with inventories well under control in keeping with the general business situation.

Japan Deliberate in Reconstruction

Little Steel Buying and Lull After Flash of Tentative Inquiries —Broad Price Control Likely if Speculation Is Attempted

NEW YORK, Sept. 11.—While any predictions as to the immediate future effect of the earthquake on trade with Japan are almost entirely speculative, the opinion of many exporters in close touch with Japanese affairs seems to be that the results will not be as depressing as might have been concluded from early reports. As was pointed out in THE IRON AGE last week, the greater part of industrial Japan is to the north and northeast and west of the devastated area. Tokio and Yokohama were distributing centers and the business headquarters of many companies engaged in importing the materials for manufacturers in other districts. At the same time there were numerous smaller Japanese factories and a few large plants near Tokio and Yokohama. Not minimizing the undoubtedly serious damage suffered, it must be realized that the greater part of industrial Japan is still unharmed and its activity will probably be given fresh impetus by the not far distant demands for reconstruction materials in the affected zone.

Difficulty in Securing Light Galvanized Sheets

What are probably forerunners of the first reconstruction needs of Japan have appeared in the past week in the form of inquiries for light gage galvanized sheets and considerable quantities of wire nails. While exporters experienced no difficulty in obtaining quotations from mills on the nails, the galvanized sheets, popular with Japanese consumers, are produced under normal conditions in Japan from American and British black sheets of Nos. 30, 30½ or 31 gage. Considerable difficulty seems to have been encountered thus far by exporters in obtaining quotations on such thin gages. In addition there has been a fair volume of inquiry for the usual specifications of No. 30 gage and lighter, one pass, cold-rolled black sheets.

Despite the destruction of Yokohama, exporters do not anticipate any unsurmountable difficulties in future shipments. The port of Yokosuka was destroyed, according to report, but this was largely a naval base and, therefore, not a direct factor in trade. The temporary loss of Yokohama, equipped with excellent dock facilities and numerous "go-downs" (warehouses) and the location of branch offices and a few main offices of importers and exporters, will prove unfortunate for a short time. In point of size and activity, Kobe, the port of Osaka, is probably second only to Yokohama, but there are other, although smaller ports, that will undoubtedly be taken into consideration until Yokohama again functions. One of these ports, which has been the destination of many export shipments, although of less importance and not as widely known, is Shimadzu, southwest of Nagoya. Another, not so well known, but equipped to handle much of the former Yokohama business is Yokkaichi to the south of Nagoya.

Little or No Damage to Large Buildings

Latest reports on the destruction in the two cities of Tokio and Yokohama, although not greatly modifying earlier estimates on the latter city, seem to show that many of the buildings originally believed totally destroyed in Tokio are still standing, but in many instances gutted by fire. Among these, largely in the Tokio business district, near the Central Station and Post Office, reported standing are the Marunouchi building, the Nippon Yusen Kaisha Building and the Nippon Oil Co. Building, all constructed by the George A. Fuller Co., New York; the head office building of the Mitsubishi Shoji Kaisha, exporters and importers, the Mitsubishi Bank, the Mitsui Co. office building and the Mitsui Bank, the Takata & Co. head office, which is understood to be of solid masonry with steel mesh floors and ceilings, built in 1910 by a German company; the Bank of Taiwan, the Bank of Chosen branch, the Yokohama Specie Bank, the Sumitomo Bank and several other buildings. Reports, however, on some of these buildings imply that they have been so twisted and racked by the earthquake that they are practically useless for reconstruction. One such report has specifically mentioned the great Marunouchi Building, but no confirmation of such serious damage has been received by the owners, the Mitsubishi Shoji Kaisha.

Possibility of Broad Price Control

The large export houses with branches in New York are now conducting most of their business from Osaka and Kobe branches. In most instances a request has been made for temporary suspension of shipment on tonnages consigned to Yokohama, but orders destined for Kobe and other ports exporters are permiting to go forward. Most exporters to Japan are looking forward to an increased demand for black sheets and possibly some galvanized sheets until the galvanizing plants in Japan can meet the demand, these sheets to be used in constructing temporary dwellings, warehouses, etc., with native lumber from northern Japan, supplemented by imports of American lumber. Some purchasing of structural steel is expected to follow, although temporarily the lighter sections that may be needed could doubtless be supplied by the Imperial Steel Works at Moji in the west. In view of the drastic measures of food price control instituted by the Government, exporters are under the impression that a similar effort at price control on other commodities will be instituted and steel prices may be under Government supervision for a time to prevent speculation.

A report circulated soon after the earthquake, claimed that the Foundation Co. had certain interests in Japan, which might have been seriously affected by the catastrophe. It is pointed out by that company that no work of any kind has been done by the Foundation Co. in Japan. At the time, however, J. W. Doty, president of the Foundation Co., was in Yokohama, accompanied by engineers of the company, following consultation with officials in Tokio on the proposed subways for that city. The George A. Fuller Co., New York, also was free of all construction work in Japan proper, having withdrawn following the completion of contracts on the Marunouchi Building, Nippon Oil Building and Nippon Yusen Kaisha Building. The only work being executed by this company in the Orient is at Dairen, Manchuria, where a general hospital is being built for the South Manchuria Railway Co.

Reports received by the Weber Chimney Co., Chicago, which has built nine concrete chimneys in Japan at various times, state that the five chimneys in the zone of the earthquake are still standing. These five were at the Hodogaya Soda Factory, Hodogaya, which is near Yokosuka, a town reported to have been virtually destroyed. Two were 125 ft. high with an inside diameter of 5 ft. and three were 75 ft. high with an inside diameter of 3 ft. The largest chimney, that of the Saganiseki Copper Smelter, Saganiseki, was not in the affected zone. It was erected in 1906 and is 570 ft. high with an inside diameter of 26 ft. 3 in. at the top and 42-ft. 8 in. at the base, built on the top of a mountain 300 ft. above the sea level.

Exhibits by the Bureau of Standards which were shown at the Brazilian Centennial Exposition in Rio de Janeiro early this year are to be on view at the Chemical Exposition at the Grand Central Palace, New York, week of Sept. 17.

Special Stiffening of Tokio Buildings

Much More Bracing Steel Used Than in American Buildings of Same Type—All Parts Tied Together to Resist Distortion

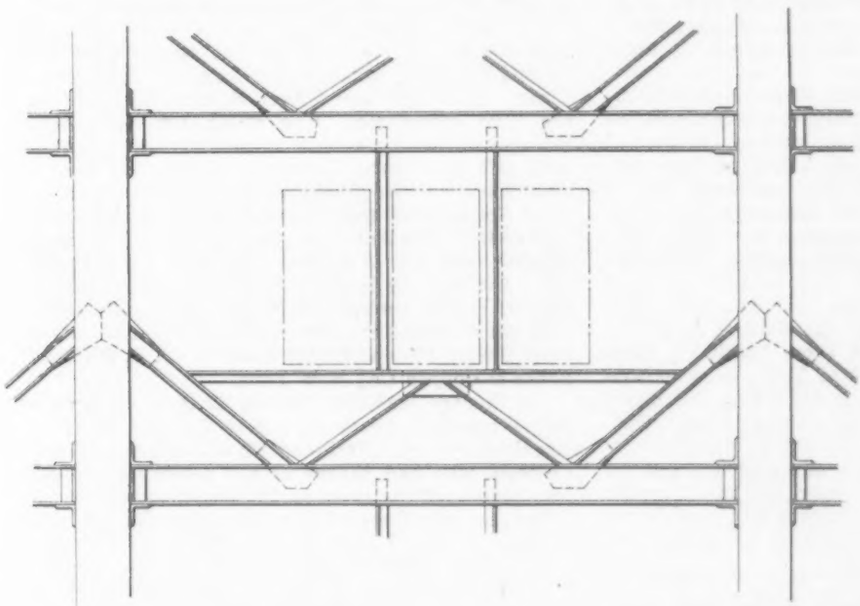
MANY studies have been made by Japanese engineers to permit them to design steel frame buildings which would be proof against earthquake shock. In general, the tendency has been to make a building which would be sufficiently rigid in itself to move as a single unit without distortion among the several parts. This differs from American practice, where the design permits a certain amount of flexibility but is stiffened against too much movement in a high wind. It is reported now that all of the steel frame buildings in Japan went through the earthquake structurally undamaged, and it is believed also that most of the important ones were saved from the conflagration by the wide open space of the station plaza which faced the Marunouchi Building.

H. V. Spurr, of Purdy & Henderson, engineers, 45 East Seventeenth Street, New York, who designed the steel work for the Marunouchi, the Japan Oil, and the Nippon Yusen Kaisha buildings in Tokio, pointed out to a representative of THE IRON AGE the essential difference in construction details between the Japanese and the American designs. "The main difference," said Mr. Spurr, "lies in the columns, the connections of the beams to the columns, and particularly in these elements as they occur in the outside walls of the buildings. The spandrels, in particular, are unusually heavy and are fitted with diagonal bracing, tieing them to the columns in a way calculated to prevent any relative movement between the two. The column splices, which occur, as in American practice, at every second floor, are exceptionally heavy and in some cases are as long as a story height. In these exceptional cases as many as four splice plates, with close to 200 rivets through them in four rows, are fitted on each side of the column.

"All of these buildings are erected on the sand underlying Tokio. They are all carried on piles of 40 to 60 ft. in length and in some cases the piles under individual columns occupy so much area that the piling becomes almost continuous under portions of the building. The footings of stone concrete, with a large amount of steel reinforcing, are poured around the heads of the piles and the individual column footings tied together by reinforced concrete beams, forming in effect an enormous mesh with space between members equal to the column spacing. The reinforcing rods in these intercolumn members, which are designed to act as both ties and struts, are carefully anchored around the column bases before the concrete is poured around them.

"All three of the buildings mentioned are similar in general structural design, but the Marunouchi Building, covering a far larger ground area than either of the others, and having in consequence much greater inherent stability, was less heavily braced than the others.

"Construction consisted in each case of short span slabs of reinforced concrete, usually 4½ in. thick and with a maximum span not exceeding 8 ft. These are carried between steel beams, which themselves are designed about as in the United States, although some of them carry heavier live floor loads than are customary here for purely office buildings. In many cases the girders between columns are made of heavy double channels, back to back, where these will carry the load adequately; I-beams of 18 and 20 in. depth, however, form the usual girders of these buildings. All three buildings have built up plate and angle columns of H-section and of unusual weight.



Diagonal Knee Braces Consisting of Channels Connecting the Spandrels with the Columns Form the Principal Stiffening Elements in Each Wall Panel. These braces, in turn, are tied together by angles running horizontally beneath the mullioned windows and further diagonals cover the center of the span. The angles running up between the windows to the spandrel above are often in pairs, back to back

"In stiffening the spandrels and their connection with the columns, the device adopted consisted of two diagonal members or knee braces above the spandrels and running at about 45 deg. from the quarter length of each spandrel to the adjacent column. These members themselves are then tied together by angles running horizontally just below the mullioned windows. This horizontal is again connected at its center point to the spandrel by two light channel diagonals reaching the spandrel at about the points of attachment of the knee braces. In each of these cases, the gusset plates are of sufficient area and weight to form a thoroughly rigid connection. In some cases a further tie is arranged by carrying vertical angles in the mullions from the horizontal already mentioned up between windows to the spandrel of the floor above.

"Much of the terra-cotta finish on these buildings may be expected to have shaken off as a result of the severe motion of the earthquake. In some cases, particularly with projecting cornices and other decorative

elements, tie rods similar to concrete bars were passed through the terra-cotta members and many pieces may thus have been held in place. Obviously, however, it was impossible to do this for all of the surface finish. Another device to hold the terra-cotta in place consisted in making the spandrel of two angles and one channel back to back and separated by a small space, with washers on the rivets to maintain the space. The terra-cotta was then fitted so that this space was available for an anchorage to hold it in place. The same arrangement, somewhat differing in detail, was made in some cases in connection with the horizontal angles passing immediately beneath the windows.

"While some of the earthquake studies have shown a definite amplitude of movement of the earth's crust, it has not been the practice to design the buildings to meet any such pre-determined condition. The buildings were designed, however, on the assumption that they were to resist a certain intensity of movement, that is, a definite acceleration in any direction."

The Marunouchi Building measures 331 ft. by about 300 ft., and is eight stories high. Above the third floor there are two large courts running up through the remaining distance. The Nippon Yusen Kaisha Building measures 152 by 286 ft. The building of the Japan Oil Co., also of seven stories, is nearly square, being 153 by 159 ft. In accordance with Japanese law, all of these buildings at points where streets intersect are curved around the corner with a radius of 12 or 15 ft. This greatly eases corner congestion of pedestrians and, as the sidewalks are similarly curved, it helps traffic in turning the corner.

As all of the work on these buildings had to be done in conjunction with Japanese engineers' specifications and to conform with the building laws of the city of Tokio, there was much detail which had be gone into and a period of a year or more was consumed in getting plans ready. The Japanese dimensions given on the plans, furnished by the Japanese engineers, were in their local measurements—not the metric system nor the American system—and all had to be translated before much progress was made.

Photographs in the office of the George A. Fuller Co., which erected all three of these buildings, show the entire "skyscraper" district of Tokio as it existed during the construction of these buildings, the latest of which has been completed within the past year. Outside these three, only one seven-story building appeared, though there were half a dozen of five and six stories. For the most part, however, the buildings did not exceed three stories even in cases where steel framing was used, and it is understood that no building in Yokohama exceeded three stories.

In an article which appeared in the September *Scribner's* (and was written many weeks ago) William A. Starrett, president Starrett Brothers, contractors, and formerly manager in Japan for the George A. Fuller Co., said:

"No matter how severe an earthquake they may prepare for, an even more severe one will surely upset calculations; and there is no controlling or determining what may be the most severe possible. But for a given problem the light skeleton structure so familiar to Americans is undoubtedly far superior to anything heretofore attempted in Japan. Every element that an earthquake of moderate severity has been known to produce can be met through the standard formulæ of strains and wind-bracing, now the common knowledge of the American engineer.

"It might be said that only in the past few years did the more progressive of the Japanese appreciate that perhaps they had missed something in undertaking the rebuilding of their cities and industries—the task that fate has set for Japan. From a hermit kingdom she sweeps on so swiftly that history will hardly be able to record the transition. And with the change comes the necessity to rebuild the structures of the whole empire. Not only are modern office buildings, hotels, apartments, factories and residences required, but the even more pressing questions of paved roads, sewers, water mains, fire protection, sanitation and transportation on a larger and heavier scale are demanding attention.

"All this means construction—vast programs of construction, vitally essential to the Japanese as they emerge into the maelstrom of modern commercial and intellectual life—a tremendous price to be paid for the heritage of world power.

The Problem of Tokio

"Tokio, like most cities of Japan, stands on an alluvial plain—a river delta formed by the erosion from the mountains which everywhere abound in Japan; a soft, muddy bottom, with an evil reputation for allowing buildings to settle, and with Mother Nature pitching in earthquakes of greater or less severity. But under that silty alluvial there is excellent sand, and under the sand hardpan, a splendid foundation soil, an American engineer would say; and, with the water level only a few feet below the surface, a splendid place for a pile foundation."

STEEL COMPANIES GIVE

Japanese Relief Fund Exceeds $5,000,000—Still Growing

NEW YORK, Sept. 11.—Receipts for the Japanese relief fund effort are believed to have exceeded the $5,000,000 mark, taking account of untabulated contributions from remote parts of the country, according to reports from Washington. More than half of the total was subscribed in the Washington district of the American Red Cross, in which Judge Elbert H. Gary is chairman of the fund committee. The quota for this district, which includes New York, was exceeded by about a half million dollars. Conspicuous among the early contributions were $150,000 from the United States Steel Corporation and $10,000 from the American Locomotive Co. The American Car & Foundry Co. donated $10,000, and the American Radiator Co., Ingersoll-Rand Co. and the Railway Steel Supply Co. each gave $5,000. Later contributions include $25,000 from the Bethlehem Steel Corporation, $5,000 from the Railway Steel Spring Co. and $1,000 from the U. T. Hungerford Brass & Copper Co., New York.

In Chicago war-time Liberty Loan committees were called together again to collect for the relief fund. Frank Wetmore, president First National Bank of Chicago, who had charge of the Liberty Loan drives, was placed at the head of the organization formed to collect contributions. The total which the city expects to raise has been fixed at $500,000. Of this amount, a quota of $22,500 was assigned to the machinery division, of which E. P. Welles, president C. H. Besly & Co., was given the chairmanship, a position which he had previously held during the loan drives. Other members of the committee are Edward H. Wachs, Stocker-Rumely-Wachs Co.; Charles Piez, president Link Belt Co.; George A. Ranney, International Harvester Co.; Edward N. Hurley, Hurley Machine Co.

Industrial Machinery for Italy

Figures of the Department of Commerce show that in 1922 more than half the value of all machinery imported into Italy was from Germany. The United States stood in fourth position with 7.4 per cent of the total. These figures included non-industrial machinery and parts. Eliminating these, the estimated value of industrial machinery received by Italy was 280,408,345 lire, of which the United States furnished 12,965,612 lire or only 4.6 per cent. Germany furnished more than ten times as much as the United States, having 46.8 per cent. Switzerland, Great Britain and France stood in second, third and fourth positions.

The Dempsey Furnace Co., 15 Park Row, New York, has acquired factory premises at 61-63 Cornelison Avenue, Jersey City, N. J., where it will manufacture industrial oil burning equipment, as well as the furnaces associated with its name.

BELGIAN MARKET FAIRLY STABLE

Export Trade Fair but Domestic Business Quiet—Luxemburg Again Complains of Coke Shortage

ANTWERP, BELGIUM, Aug. 22.—For the present prices are fairly well stabilized. Quotations on iron and steel are still very high and the market is firm, but the upward tendency is not as strong as during the past five or six weeks. Some products are higher, especially finished materials, and several works are fully booked for some time to come in the face of an active demand. Bars are quoted at about 775 fr. and beams at 750 fr., an advance of 25 fr. per ton. Rails for export are not obtainable at less than 750 fr. per metric ton. Purchases of rods have not been as large as expected, so that prices, even for export, are unchanged at about 925 fr.

Prices to American and British importers and merchants of other high exchange countries are actually lower than formerly on some products. The franc, however, has somewhat recovered in value.

On the basis of today's rate of exchange some of the following domestic prices are lower than those of a fortnight ago, with which they are compared:

	Aug. 22		Aug. 8	
	Fr. per Metric Ton		Fr. per Metric Ton	
Commercial iron No. 2	750	$33.20	750	$33.80
Commercial iron No. 3	800	35.40	775	35.00
Commercial iron No. 4	875	38.80	875	39.40
Heavy sheets	800	35.40	750	33.80
Light sheets	1,150	51.00	1,125	50.50
Iron bars	775	34.30	750	33.80
Rails	750	33.20	750	33.80
Heavy beams	725	32.00	725	32.60
Rods	950	42.00	900	40.50
Open-hearth:				
Ordinary	775	34.30	725	32.60
Special	1,075	47.50	1,050	47.50
Rounds	1,450	64.20	1,450	65.35
Spring steel	1,400	62.00	1,400	63.00
Basic Bessemer ingots	560	24.80	550	24.80
Blooms	600	26.60	590	26.80
Billets	640	28.30	630	28.40
Largets	670	27.65	660	29.80

Not much domestic business has been done, a large number of consumers and merchants being on vacations this month.

Luxemburg makers are quoting semi-finished products in Belgium at slightly higher prices.

	Fr. per Metric Ton	
Bessemer ingots	560	$24.80
Blooms	600	26.60
Billets	655	29.00
Largets	675	29.80

Makers of Luxemburg complain of the low value of the Belgian franc. Industry had somewhat revived with more coke available and prices higher. But coke is now becoming scarce again, while prices are no longer favorable, as the greater part of the raw materials is supplied by France and the ratio between French and Belgian francs is about 100 French to 126 Belgian. Stocks of coke in Luxemburg are decreasing rapidly and it is feared that some blast furnaces will be forced to blow out before long. During August 26 furnaces have been operating out of a total of 47. This represents an increase of nine over June.

The numbers of furnaces operating in Belgium during July was 39, 5 units more than in June. These furnaces produced during this period 187,000 tons of pig iron and 176,000 tons of rough steel.

Nominal prices for No. 3 Belgian foundry iron are 480 fr. (exchange rate, 22.30 fr. to the $1), $21.20 per metric ton delivered consumer's work, or f.o.b. Antwerp. This price also is quoted by Luxemburg furnaces for September-October delivery. Lorrain works are still refraining from quoting on long deliveries. These works lately advanced their price to 400 fr. (French). Business at this price is improbable, as some merchants, having stocks at the furnaces which were to be shipped before the end of this month have offered tonnages at prices much under the market. Such prices are only occasional and it is expected that before long the higher prices will be obtained. Some British importers have taken these special lots and a few good orders have been placed by Scotch merchants. The prices paid were about 92s. per ton, f.o.b. Antwerp, or $20.80.

There are large English and Scotch inquiries in the Belgian market for Bessemer iron. Quantities available, however, are small and prices about 520 fr.—$23 per metric ton.

Offerings of British hematite are small. Notwithstanding the firmer tone of the British market, Belgian consumers still are hesitating, relying on a better rate of exchange in the near future. The actual price of 106s., c.i.f. Antwerp, or 540 fr., is higher than Belgian or French makers are quoting.

The coal market maintains an upward tendency. Prices are higher even for domestic qualities. The arrivals of coal from the Ruhr have not been as large as expected. To date somewhat more than 4000 tons have been received by the furnaces, while it was expected that receipts would be more than 12,500 tons this month.

Allied Machinery's Japanese Representatives Are Safe

The Allied Machinery Co. of America has received information by cable from T. G. Nee, president Horne Co., Ltd., of Japan, that the entire head office staff of the latter in Tokio is safe. The exact status of the merchandise stocks and of the records of the business in Tokio has not yet been determined. Less than one-third of the company's stock is, however, carried in Tokio. None of the 13 branches of the company in Japanese territory was affected by the recent disaster. The Horne Co., Ltd., is, therefore, fully prepared to continue its business as distributer in Japan for American manufacturers of machine tools, industrial and construction machinery, building materials and allied lines. The Allied Machinery Co. of America, with which the Horne Co., Ltd., is closely affiliated, will continue to handle the affairs of the latter in this country.

The Basset Direct Steel Process in Belgium

Interesting information relating to the Basset process of producing iron directly from the ore comes from Belgium, says the London *Ironmonger*. It will be recalled that in this process a rotating furnace with a very high temperature of reduction is employed, the fuel being pulverized coal. The process was taken up by the Société d'Ougrée-Marihaye, the large Belgian steel firm, and at the recent general meeting of this company the president, Gustave Trasenster, a well-known figure in Belgian iron and steel circles, gave some details of the experimental work carried out in collaboration with Mr. Basset. Mr. Trasenster declared that the tests made by his company substantiated Mr. Basset's claims as to the process itself; but, as so often happens when successful laboratory methods are applied, difficulty was encountered when the process was tried in practice, because the furnace lining could not stand the high temperature necessary for the completion of the reduction.

The Ougrée-Marihaye company came to the conclusion that the next step was experimental work to find a lining which would not fail under working conditions. Mr. Basset apparently was not of the same opinion, and commenced experiments with a new furnace of the fixed Martin type. Mr. Trasenster thinks that even if these were to prove entirely successful they would be unsound economically; a deadlock has followed, and, for the time being, the Ougrée-Marihaye company has stopped further experimental work. It will be recalled that, when pulverized fuels were first introduced, a great deal of difficulty was experienced with disintegrated linings, but this was gradually overcome by careful study of the conditions, and application of the results of recent researches on refractories.

What the outcome of the Ougrée-Basset controversy will be is not apparent. If the experimental work is resumed and brought to a successful issue, it will behoove our smelters to look to their laurels, as with the Basset process lower grade ore and fuel can be used than is possible at present and, with cheap labor, the manufacturing price of iron would be lower than ever.

German Founders' Zeal for Their Art

Triple Convention at Hamburg Shows the Progressive Spirit of the Industry—Special Attention to the Training of Apprentices—Molding Sand Research

(Special Correspondence)

HAMBURG, GERMANY, Aug. 25.—The annual meeting of the Verein Deutscher Eisengiessereien, which was held in Hamburg this year, beginning Aug. 19, was noteworthy for an exhibition of foundry appliances and aids which was planned on quite different lines from those of the American Foundrymen's Association, in that it was wonderfully educational and had as the fundamental thought the application of science in the foundry. The substantial showing of molding machines, electric furnaces, crucible furnaces, general appliances and accessories—of remarkably fine finish in execution and of designs that differ considerably from those in the United States—was really but an annex to a display of educational matter for apprentice as well as seasoned foundrymen that has been unequaled in the history of the art.

A Triple Convention

The value of the meeting and exhibition was further enhanced by the fact that the second great foundrymen's association of Germany, the Verein Deutscher Giesserei Fachleute, and the Executive Commission of Germany on Foundry Research had arranged their annual conventions for the same time and place. In explanation of the status of these three organizations it may be stated that the first named body of foundrymen would correspond to the National Founders' Association of the United States, but with the added function of regulating prices and contracts, in close contact with the German Government. The second mentioned body corresponds to the American Foundrymen's Association, the members being technically trained men. The third group consists of representatives from the great industries having foundries, and the object is educational and research, embracing the training of apprentices and developing progressive courses which will aid foundrymen in training their young men, thus starting foundry education where it belongs and working from the very bottom up. A further object is the study of foundry raw materials, melting methods, testing, specifications, etc. The joint meeting of these bodies enabled the carrying out of the plan of making the exhibition a real school of instruction for foundrymen, as a series of lectures, repeated frequently during the two weeks, was given by competent authorities to the continually changing groups of visiting foundrymen. As an attempt at educating the entire foundry industry of a country to think and work along scientifically correct lines, and thus enhance the economic value of that industry, the undertaking is certainly unique, valuable and worthy of emulation by the rest of the foundry world.

Three large rooms were filled with educational exhibits. These were contributed by the apprentice instruction divisions of some of the very large German works, such as the Augsburg-Nuremberg Machine Works, Ludwig Loewe & Co., and others of equal note, and arranged under the auspices of third group above mentioned, called the German General Committee on Trade Schools—Deutscher Auschuss fuer Technisches Schulwesen (abbreviated to "Datsch"). The walls were covered with plates from the publications of the trade school committee and almost numberless colored drawings of the apprentices selected from many works giving their young men this so necessary instruction.

Patternmaking Exhibit.

The display began with the essentials of patternmaking, the incorrect and correct selection of wood, methods of gluing together, application of screws, location and sizes of prints, proper and improper arrangements of loose pieces, and so on along the range of pattern work. With the bad and the good patterns there were actual castings from each, with gates attached, showing the results thus obtained. Similarly a whole range of bad and good gate arrangements, with castings full of shrinks and good castings respectively. Further series of castings with defects corrected by burning on iron and the several welding methods. The patterns were splendidly executed and the castings showed the care that must have been taken in the molding operations. In connection with this display was one showing the progress that has been made in standardization of patterns—all colors being now standardized and this work going on, apparently ahead of the American attempts along this line.

It was interesting to note the classes of apprentices from the Hamburg trade schools and foundries brought by their teachers and shown about by the energetic secretary of the "Datsch" organization, Dr. Harm. These boys were eager to have the drawings, patterns and castings explained to them and appreciated being presented to the American visitors who addressed words of encouragement to them and praised the performance of their mates in actual work at the foundries.

Cast Iron Testing

In addition to this educational exhibit there was one on the testing of cast iron, with a large number of fractured pieces, sections and tables of results. This exhibit was arranged by the famous head of the German Testing Bureau, Professor Rudeloff, who will be well remembered in America. The general supervision of the exhibition was under the care of Prof. U. Lohse, of the University of Hamburg, ably seconded by the well-known foundry engineer J. Mehrtens. The occasion was somewhat marred by the imprisonment of the president, Dr. Werner, in the Ruhr at the moment of his departure, he being held in confinement as a hostage, and the further retention of much of the exhibit material in that unhappy region.

There were many interesting features of the exhibits proper, and a few deserve special mention. Older foundrymen will remember the little instrument exhibited at the Cincinnati convention of the A. F. A. by the late Thomas D. West, by which he was enabled to gage the hardness of the rammed sand of a mold. A beautiful adaptation of this idea was exhibited in an instrument by Treuheit, in which a large steel ball can be pressed into the mold and the depth of indentation measured very delicately. The Government railroads had a fine display of broken locomotive castings which had been repaired by the electric welding process, among them some locomotive compound cylinders.

All along the walls of the exhibits were displayed plain and color drawings of air furnaces, cupolas, conveying machinery, cupola charging apparatus, sand preparation installations, etc. These were all working drawings, with full dimensions, and were intended for the instruction of those interested. In fact, contrary to all previous experience with German industrials, here was a case of no secrets whatever. It was interesting to note the gradual change from cupola charging constructions on the very wrong inclined dumping method to the correct straight drop. Unfortunately, however, the buckets in the designs are still too small in diameter and the layers of metal and coke will not drop level as they should when the buckets are almost the full cupola diameter.

Noteworthy Exhibits

An exhibit sign which would draw a smile from any American visitor read "Fluorspar Trust," when

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ESTABLISHED 1855

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Ending the Coal Strike

THERE was reason to expect that Governor Pinchot, acting as mediator, would end the anthracite strike, and substantially as happened. When two parties in a business controversy are quarrelling over terms, one of them demanding a higher price and the other naturally resisting, it is the common expedient for the mediators to say: "You are both good fellows and would best split the difference." Neither of them can well refuse such advice, especially when one has probably been asking more than he expected to get and the cost to the other is not going to be so much as appears prima facie. The absence of public excitement respecting the coal strike reflected an appreciation that something like this was going to happen. Also, that the prolonged palavers were to get people accustomed to the idea that they were destined to pay a higher price for anthracite coal.

Once more it has happened that the public has lost a strike. The miners get substantially what they wanted. The operators do not care particularly; the public pays. Governor Pinchot, who is regarded as the Sir Galahad of the Progressives, might at least refrain from shedding crocodile tears and from talking about how the advance ought to be absorbed by the operators and carriers, although, of course, it will not be.

All that the settlement of the anthracite strike means is that the politicians have washed their hands of a troublesome problem. There has been no step taken toward economic solution. The two-year contract gives us only a breathing space, at the end of which the United Mine Workers may make new demands and get them unless something important happens in the meanwhile.

We are, in short, at the mercy of the United Mine Workers, as President Harding said, and as President Coolidge and Governor Pinchot have in effect agreed. There has been no official suggestion on the simple line of undoing the economic restrictions that fetter the coal mining industry and prevent it from functioning freely like other producing industries. The talk about cost of living, cost of production, profiteering and all of that is simply a smoke screen to divert attention from the basic evils with which nobody political likes to grapple.

The facts are that we have a large and convenient supply of a desirable fuel, whereof the production is reserved for about 150,000 men, closely banded together, who will not even work a full year's time owing to the numerous holidays that they like to enjoy; while another branch of the coal mining industry has a surplus of about 200,000 men whom the public has to support in idleness. Manifestly such a condition can exist only by virtue of economic restrictions, in which the United Mine Workers is a great factor.

Until the American public shows more spirit it will be condemned to submit to the exactions of the anthracite miners. In being constrained to pay more for anthracite coal, it will have less with which to buy other things. No matter how high the barriers that are erected, however, economic forces tend naturally to flow over them. The higher the price for anthracite, the greater will be the incentive toward substitutes. It will require no stretch of the imagination to foresee that the powerful oil producers, who are just now afflicted by a grave over-production, will leave no stone unturned to substitute their fuel for anthracite wherever that can be done, and their technical staffs will probably devise new means for doing some things that now look impossible. The greatest concern of the anthracite operators throughout the recent controversies has been the preservation of their industry and their capital.

LESS than seven days ago a leading New York daily in an editorial article headed "Dies Irae," noted a portentous accumulation of disasters —the return of the annual holdup of the public by the coal miners; the warlike attack of Italy on Greece; and then the news from Japan of the greatest natural cataclysm in recorded time, which might mean the crippling of a great power for a generation. All this, with the continuance of the Ruhr malignancy, filled the air with depression like that of the last year of the great war. But how changed the picture at the beginning of a new

week. The coal strike settlement has removed the threat of heatless homes. In the Greco-Italian dispute the way to peace has been found. The Japanese catastrophe, with all its horrors, proves to be far less than was feared, relief is pouring in on a scale that will fully meet the need and set reconstruction well on its way. And after months of war, passive and open, in the Ruhr, the world hears of Germany's purpose to end her resistance to France and to open direct negotiations. A single week has worked marvels in the clearing of the world's troubled atmosphere, and again the economic prophets are venturing to say that fundamentally business conditions are sound.

Art and the Industrial Problem

A STRONG plea for the use of art in solving industrial problems by bringing men to face each other as brothers is made in *Scribner's Magazine* for September by Gerrit A. Beneker, artist and illustrator of Provincetown, Mass., who, by visiting machine shops and steel plants and painting portraits of the workers as he found them, came into such close and friendly relations with them that he had large influence, and in the case of a Cleveland steel company was put on the industrial relations advisory board. He often helped workers and officials to understand each other better. His constant aim was to show men that they were important as individuals in the organization and not merely cogs in a machine.

As one reads Mr. Beneker's account of his experiences with the workers, he is convinced that the curiosity of the men was aroused and that there was a direct appeal to their better natures. The artist tells the story of how he found Steve Rigo galvanizing rims for automobile wheels, painted his portrait and called him a "Galvanized American," protected by his American citizenship. This was a patriotic thought and had the desired effect on Steve Rigo. Mr. Beneker asks: "Is there not in every human being a divine spark which can be breathed upon with art through a picture, a statue, a play, a song or a poem, and kindled into a glowing ember, a flame, a consuming conflagration which will spell achievement?"

Idealism? Dreaming? Perhaps it is. However that may be, Mr. Beneker has what the industrial world sorely needs today, the ability to sympathize with men and influence them to act reasonably.

HOW will the Japanese catastrophe affect the American copper market? So much depends on foreign buying of that metal that any new demand stirs producing interests. Japan has been a heavy buyer of American copper for some years, although a new tariff law last year slowed down the movement. In the four calendar years since the war—1919 to 1922—our exports to Japan of refined copper as ingots, bars, etc., were 110,060 gross tons, or about 11 per cent of the total exports in those four years. While the amount is small compared with purchases of Germany, France and Great Britain, it is by no means insignificant. How much of this copper will have to be re-purchased can only be conjectured, for much of it was used outside the devastated areas. That substantial quantities will be needed in the coming months is a reasonable expectation, the history of rehabilitation following catastrophe being like that of reconstruction after war, in the larger use of materials insuring longer life or better protection from the elements.

Pig Iron and Steel Production

A RHYTHM can be seen in the ascending and descending production of pig iron and steel in the past eight or nine months. The rates of ascent and descent have been approximately the same, but the pig iron peak came after the steel ingot peak.

The high rate in steel ingot production came in April, with a daily rate of 157,776 tons, as reported by the American Iron and Steel Institute. This corresponded to an annual rate, 311 working days, of a shade more than 49,000,000 tons. August, the fourth month after April, brought a daily rate of 136,276 tons, or 14 per cent decrease. Four months before April was last December, with a daily rate of 132,017 tons. The intermediate months also matched up fairly well, January agreeing closely with July and February with June.

In pig iron the high rate was in May, our report showing a daily rate in that month of 124,764 tons. August, the third month afterward, showed 110,816 tons, or 11 per cent decline, while February, the third month previous, had shown 106,935 tons a day. The descent has been somewhat more gradual than the ascent.

There is no plainly apparent reason why pig iron production, in its rise and fall, should trail steel production. Steel production would naturally trail pig iron production, but not by such an interval as could be noticed. Possibly the steel works were using more scrap in the early months of the year and lately have been disposed to liquidate ore. Coke is cheaper in the market, but that would hardly influence the interests that make the coke themselves.

That the rate of steel ingot production decreased 14 per cent in four months and that pig iron production fell 11 per cent in three months are two facts that need to be considered in appraising the condition and prospects of the steel market. The decreases have been due to lessened insistence upon deliveries for the major part, though weather conditions may have exercised some influence.

Relative to peak rates production is lighter now, but relative to previous years it is heavy. Even assuming that steel ingot production is lighter now than it averaged during August, the rate is probably above 40,000,000 tons a year, whereas the average rate in the four post-war years was only 32,000,000 tons a year. Thus we have had a great bulge in production and after the rate has declined we are still doing 25 per cent better than the post-war rate prior to this year.

The actual consumption of steel is undoubtedly very heavy. It may be thought that steel has

accumulated in the hands of buyers. It is often remarked that such accumulations are found, after a period of activity, but the suggestion that mistakes must have been made is not altogether fair. Stocks are required for the proper conduct of building, manufacturing or jobber-distributing operations, and what is a normal stock at one time may look large at another time and vice versa.

Canada's New Patent Act

CANADA'S new patent act which became effective Sept. 1, while not departing in any way from the principle of compulsory working, removes some of the more severe restrictions as they applied to inventions of Americans and other foreigners. The principal changes have to do with conditions which the applicant must fulfill in order to obtain a patent and those with which he must comply in order to maintain the patent in force.

The authorities of the Dominion remain convinced that the manufacturing industries of the country and the good of the public are best served by eliminating the idle patent, which the laws of the United States still permit. Here a foreigner is given a patent that will prevent the manufacture of his invention in this country. He himself need not produce it here, nor can he be compelled to issue a license to another to produce it. He may confine his manufacturing to his own country and import his product into America, under full protection of our laws. Canada, as well as Great Britain and most other nations, hold that this is not a wise law.

The new Canadian act abrogates two conditions that have worked against American inventors. One was that if goods manufactured under an invention were shipped into the Dominion after one year from the time the patent was issued in another country, the inventor forfeited all right to a Canadian patent. The other condition was that under a Canadian patent the invention must be manufactured in Canada within two years, else protection automatically ceased.

Manufacturing and licensing provisions are now established which follow closely the British act. The patentee must satisfy the reasonable requirements of the public and adequately manufacture the patented article or carry on the patented process in Canada. Any person may apply for a compulsory license within three years of the date of the patent, and not less than one year after the passing of the act, and may obtain such license if he can show that the reasonable requirements of the public have not been satisfied, by failure of the patentees adequately to manufacture or to grant licenses upon reasonable terms, or if unfair conditions have been attached by the patentee to the use of the invention.

The patent may be revoked at any time not less than three years after its date, and not less than one year after the passing of the act, if the patented article or process is manufactured or carried on exclusively or mainly outside of Canada to supply the Canadian market with the invention covered by the patent. Upon such an application to revoke, the patent may be revoked "unless the patentee proves that the patented article or process is manufactured or carried on to an adequate extent in Canada, or gives satisfactory reasons why the article or process is not so manufactured or carried on." The patent may be revoked forthwith or after a reasonable interval. Application in Canada must be made within one year of filing in any foreign country, or within one year of the date of the passing of the act.

Japan and American Steel

NATURALLY in the discussion of the calamity that has overwhelmed Japan not a little has been said as to the large amount of new material that will be needed to rebuild the devastated areas or to found new cities. Those who recall the exaggerated estimate of requirements in steel and other materials of construction that followed the San Francisco earthquake have been chary of prediction. However, new emphasis has been given to the fact that Japan, since the war particularly, has been one of the largest buyers of American iron and steel. Without the trade of that country and Canada, our steel exports would fall to pitiful figures.

The magnitude of Japan's purchases of American steel in the last four years affords some basis for estimating her new needs. Official statistics give the destination of only a part of the domestic products sent to foreign countries. An analysis of these for 1919, 1920, 1921 and 1922 makes the following showing on seven leading products:

	To Japan, Gross Tons	Per Cent of Total for Each Product
Steel plates	506,850	24.5
Rails	464,000	25.0
Steel sheets	378,560	50.0
Tin plate	153,139	25.0
Wire (except barbed)	99,680	17.5
Wire nails	66,430	25.0
Galvanized sheets	32,600	8.5

In four years Japan has taken over 1,700,000 tons, or about 26 per cent, of the exports of the above materials, which aggregated nearly 6,500,000 tons. Outstanding has been her consumption of black sheets, of which Japan has absorbed over 50 per cent of our exports, besides buying heavily from England; in 1922 she took 74 per cent of what we shipped abroad. If structural steel, rods, bars, pig iron and some other items were included, the total would expand considerably. To this estimate, copper, zinc, machinery and automobiles are to be added.

Ten years ago, or in 1913, Japan's purchases from American mills were insignificant compared with those for any year since the war. The industrial advance yonder during the war and since has been phenomenal. While no measure can now be taken of the portion of these heavy purchases which must be re-bought, since much of them entered consumption in unharmed areas, there is no question that much of the financing of reconstruction will be done here and that Japan will continue to be a heavy buyer of American rolled steel, metals and machinery.

NO TAX REDUCTION

Little Prospect of Relief from Congress—Bonus an Important Factor

WASHINGTON, Sept. 11.—Difference of opinion prevails among Republican leaders of Congress regarding possible legislation at the next session of Congress for reduction of taxes. Meanwhile business interests of the country will have to await the report of a board appointed by Secretary of the Treasury Mellon, which is making a comprehensive study of the entire tax problem before any clear indication may be had as to whether they will get relief or not. The oustanding obstacle is the apparent probability that a soldier bonus law will be enacted, involving billions of dollars. Senator Smoot, of Utah, who probably will be chairman of the Committee on Finance, has said that bonus legislation will be passed and that tax reduction consequently is not to be expected. Representative William R. Green of Iowa, who probably will be chairman of the House Committee on Ways and Means, has said that if a soldier bonus law is enacted no tax reduction may be expected. Chairman Madden of Illinois, of the House Committee on Appropriations, has prepared a preliminary plan for a so-called automatic reduction in income taxes, which he says will be worked out in detail and introduced at the next session of Congress and will give relief to business in the way of taxes. All three of these prominent leaders of Congress have recently held conferences with President Coolidge. The position of the President on the subject of a tax program has not been revealed.

At this time it is the general view that Senator Smoot is correct in saying there will be no tax reduction. His insistence upon soldier bonus legislation has created this opinion. While he proposes to raise the enormous amounts necessary to pay all soldiers who served during the world war, whether at home or abroad, by levying so-called luxuries taxes on a greater scale, it is also claimed that it will be necessary to maintain present taxes of other kinds in order to obtain the necessary money for the soldiers.

Rigid Economies

The underlying principle of the Madden plan is for a reduction in Government expenditures through more rigid economies. It is his idea to cut down taxes in any calendar year following any fiscal year in which a surplus expenditures is shown. Under this scheme, the taxpayer would be given a pro rata cut in his taxes, based on the surplus of income over expenditures of the Federal Treasury. There now exists a surplus of more than $300,000,000, although this would not be returned. At the same time, figures of probable income tax yields, collected over several years, it is proposed, would be so applied to expenditures authorized for the fiscal year 1925 that no further surplus would accrue in 1925. In other words, it is the plan of Mr. Madden to have contributions by business and other taxpayers based on the actual needs of the Government. But with this plan in effect there is to be carried the responsibility of taxpayers to make up any deficit that may accrue from one cause or another.

Mr. Madden, sharing the attitude of Secretary Mellon, is in favor of a reduction in surtaxes to a maximum figure of 25 per cent on a graduated scale, which, with the 8 per cent levied on incomes in the higher brackets, would make a total possible tax of 33 per cent.

Soon after a second conference between President Coolidge and Representative Madden, the Chief Executive conferred with Representative Green, whose views were not so cheerful as to possible tax reduction as were those of Mr. Madden. Mr. Green declared that any revision in taxes will depend principally upon the attitude of Congress toward soldier bonus legislation, which Senator Smoot has said will be enacted. Mr. Green declared that if such legislation is passed, some means of raising the money will have to be devised and he is understood to be opposed to the Madden plan to authorize the Secretary of the Treasury to reduce taxes in proportion to the surplus of the Government income over expenditures. Mr. Green said he hoped that the report of the Mellon board which is studying the tax problem will be ready for the Ways and Means Committee when Congress convenes in December.

Mr. Green said that he proposes to reintroduce his bill for a constitutional amendment to prohibit the issuing of tax exempt securities. He also said that it is probable that changes will be made in the tax laws for the purpose of simplifying them and eliminating questionable features. A board is at work on this matter also.

Wage Adjustment for Ten-Hour Men Had Been Expected in Pittsburgh

PITTSBURGH, Sept. 10.—Announcement last week by Judge Gary of an adjustment in the wages of workmen employed in the non-continuous departments whereby these men will receive 11 hours' pay for 10 hours' work occasioned little surprise here. Indeed, such an adjustment was looked upon as necessary to keep the men working the 10-hr. day satisfied, since the elimination of the 12-hr. day in the continuous process departments brought a 25 per cent increase in wages and made it possible for men in these divisions to earn as much in eight hours as the day wage men in the non-continuous departments earned in 10 hours. It is believed in well informed quarters here that this adjustment in the wages of the 10-hr. men is but the first step in the direction of setting up an 8-hr. day for these men.

Meanwhile, elimination of the long working day in independent steel plants in this district is progressing, Pittsburgh Crucible Steel Co., Pittsburgh plant at Midland, Pa., is the latest to inaugurate the change. The Jones & Laughlin Steel Corporation will soon start the shorter day at its blast furnaces, steel works and coke plants.

Tin Plate and Sheets to India

American exports to British India over a period of years show the following shipments of tin plate and of black steel sheets, according to the records of the Department of Commerce:

Calendar Year	Tin Plate (Gross Tons)	Steel Sheets (Gross Tons)
1913	58	*234
1914	1,210	*493
1915	8,330	*3,060
1919	10,545	2,109
1920	3,322	1,602
1921	2,089	2,231
1922	3,581	55
1923†	2,931	....

*Fiscal year, ended June 30.
†First seven months.

The Iron Age and Its Japanese Readers

The circulation department of THE IRON AGE has taken steps to reach all our subscribers in the stricken districts of Japan to give them a word of sympathy and to offer such special help as we may. Our sincere wish is that none of them may be found to have suffered severely, but with a company of readers in Nippon numbering several hundred, it is realized that this may prove a vain hope.

There is satisfaction in knowing that the disaster did not reach the leading manufacturing sections, which extend in both directions from the district taking in Tokio and Yokohama—a fact which was emphasized in these columns last week and elaborated on a few days later by Secretary of Commerce Hoover. Reconstruction will not have to wait primarily on the manufacturing resources of other nations, but the re-establishment of the commercial structures of the devastated area will be in the hands of the energetic, purposeful, persevering Japanese themselves.

Iron and Steel Markets

FALL BUYING WAITS

Steel Works Operations Adjusted to Lessened Demand

Wire Nails Bought for Japan, With Sheet Inquiries Still Pending—More Rail and Car Orders

The first ten business days of September have passed without improvement in new buying of steel products to the extent that had been expected. While some of the reduction in output in July and August was called seasonal, it now appears to have been in part also an adjustment of operations to a lessening scale of demand.

Whereas August bookings of finished steel by important producers were about up to the rate of July, and in some cases exceeded it, the general experience is that September has not maintained the August rate.

The Steel Corporation's falling off of 496,000 tons in August in its unfilled orders was accompanied by a reduction to 85 per cent in its rate of output. It had on its books Aug. 31 about 1,565,000 tons less than on June 1, when it was running at 95 per cent of capacity. Independent companies are today operating on a 70 to 75 per cent basis.

Thus the industry as a whole is producing ingots at a yearly rate slightly over 40,000,000 tons, as against upward of 49,000,000 tons as the rate of April, the peak month.

Apart from the buying of 30,000 to 40,000 kegs of nails for early shipment, little of the inquiry for Japan has resulted in business as yet. Thus far about 6000 tons of sheets have been asked for to sheath temporary structures, and much more sheet inquiry is looked for in the next 30 days. The total of shapes, plates and bars asked for on Japanese account is about 20,000 tons.

It is believed that several months will elapse before the real reconstruction needs of the stricken districts can be definitely known.

Labor supply has been such that leading producers in the Pittsburgh and nearby districts have been able nearly to complete the abolition of the 12-hour shift at blast furnaces, coke ovens and steel plants. In the Chicago district about half the 12-hour men have gone to the shorter day. Generally the change has been more rapid than was expected, many workers who have been on outdoor jobs having applied already at Central Western steel works.

Less is heard of the shorter day as a definite factor in finished steel prices, though the week has brought a 10 per cent advance in the hourly wage rate of the 10-hour men. It is recognized, however, that with higher costs producers will be more disposed to adjust output to demand than to try to fill up their mills by cutting prices.

The latest rail order is 26,000 tons placed with the Illinois Steel Co. by the Canadian National Railways for its lines in the United States. The rail mills now have a comfortable backlog and further good-sized orders are expected. The Pennsylvania Railroad, which has not been a buyer of rails this year, is soon to be in the market. Its plans for buying 12,000 to 15,000 cars have just become known also. Car works will need more business within 30 to 60 days.

The Norfolk & Western's total rail purchases are close to 60,000 tons, and it is now in the market for 10,000 tons of tie plates.

The policy of manufacturing consumers is still one of keeping close step with the mills, stocks being well drawn down all along the line. Jobbers are having less to do, seeing that so many mills can deliver promptly.

In finished steel the price structure holds, as for many weeks, sheets still being the most notable exception. The automobile industry is specifying more liberally in body sheets and there is the beginning of fourth quarter buying.

Products in which concessions are appearing are bolts and nuts, hot rolled flats, track fastenings, light rails, hard bars and wire fence.

Some deliveries on bars have been held up and in the Chicago district two mills that roll bars from old rails have shut down due to the falling off in demand for reinforcing bars.

Chicago finds more signs that high labor cost has caused the putting aside of building plans. At Cleveland two buildings in prospect will each take 5000 tons of steel. For the new Union passenger station there 50,000 tons will be needed, but none of it this year.

Hopes of an advance in the pig iron market based on an anthracite strike are now in abeyance. Following the settlement of the strike, the price of furnace coke has declined 50c. and in most centers the pig iron market again shows a sagging tendency, although at Pittsburgh and Cleveland there is more activity and foundry iron at Pittsburgh is held 50c. higher. Lake blast furnaces are pursuing an aggressive policy at distant points and another shipment of iron has been made from Buffalo to Chicago. In the South some furnaces have quoted as low as $23.

More activity has appeared in ferromanganese, but resales dominate the market. The usual price is $112.50, seaboard, although as low as $110 has been quoted.

Pittsburgh

Buying Movement in Steel Not Developed—Japan's Needs Undetermined

PITTSBURGH, Sept. 11.—Improvement in the demand for steel confidently looked for over the past few months to develop in September has not yet materialized and the tendency to reduce production to the proportions of current demand is becoming more pronounced. The experience of the Steel Corporation with its loss of 500,000 tons in its unfilled obligations in August is fairly typical of the industry as a whole, save that independent companies have been able to take on more early delivery business than the Steel Corporation, and much of the recent buying has been of that character. It is a reasonably safe estimate that new business of independent companies lately has been

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept.11, 1923	Sept.4, 1923	Aug.14, 1923	Sept.12, 1922
No. 2X, Philadelphia‡	*$26.26*	$26.76	$25.76	$34.64
No. 2, Valley furnace†	**25.00**	24.50	25.00	35.00
No. 2, Southern, Cin'ti†	27.55	27.55	27.55	29.05
No. 2, Birmingham, Ala.†	23.50	23.50	24.00	25.00
No. 2 foundry, Chicago*	27.00	27.00	27.00	32.00
Basic, del'd, eastern Pa.	25.00	25.00	25.00	32.00
Basic, Valley furnace	25.00	25.00	24.50	32.50
Valley Bessemer, del. P'gh	28.26	28.26	28.26	34.77
Malleable, Chicago*	27.00	27.00	27.00	32.00
Malleable, Valley	24.50	24.50	24.50	33.00
Gray forge, Pittsburgh	25.76	25.76	25.76	36.77
L. S. charcoal, Chicago	32.15	32.15	32.15	36.15
Ferromanganese, furnace	112.50	112.50	117.50	67.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	42.50	42.50	42.50	40.00
O.-h. billets, Pittsburgh	42.50	42.50	42.50	40.00
O.-h. sheet bars, P'gh	42.50	42.50	42.50	40.00
Forging billets, base, P'gh	47.50	47.50	47.50	45.00
O.-h. billets, Phila.	47.67	47.67	47.67	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	47.50
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.40	2.40	2.40	2.00
Light rails at mill	2.15	2.15	2.25	2.00

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.67	2.67	2.67	2.575
Iron bars, Chicago	2.40	2.40	2.40	2.25
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.60	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.00
Tank plates, Chicago	2.60	2.60	2.80	2.30
Tank plates, New York	2.84	2.84	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.60	2.60	2.70	2.20
Beams, New York	2.84	2.84	2.84	2.34
Steel hoops, Pittsburgh	3.15	3.15	3.15	2.75

Sheets, Nails and Wire,	Sept.11, 1923	Sept.4, 1923	Aug.14, 1923	Sept.12, 1922
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh	5.00	5.00	5.00	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.60
Plain wire, Pittsburgh	2.75	2.75	2.75	2.35
Barbed wire, galv., P'gh	3.80	3.80	3.80	3.15
Tin plate, 100-lb. box, P'gh	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	$20.00	$20.00	$19.50	$23.50
Carwheels, Philadelphia	21.00	21.00	20.00	21.00
Heavy steel scrap, P'gh	18.00	18.00	18.00	19.50
Heavy steel scrap, Phila.	17.00	17.00	16.00	16.00
Heavy steel scrap, Ch'go	16.50	16.50	16.00	18.50
No. 1 cast, Pittsburgh	22.00	22.00	21.50	21.50
No. 1 cast, Philadelphia	21.50	21.50	20.00	21.00
No. 1 cast, Ch'go (net ton)	**20.00**	19.50	17.50	22.00
No. 1 RR. wrot, Phila.	**19.00**	18.00	18.00	21.00
No. 1 RR. wrot, Ch'go (net)	16.00	16.00	14.00	18.00

Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	*$4.50*	$5.00	$4.50	$11.00
Foundry coke, prompt	*5.75*	6.00	5.25	12.50

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**14.12½**	14.00	14.50	14.12½
Electrolytic copper, refinery	**13.62½**	13.50	13.87½	13.75
Zinc, St. Louis	**6.55**	6.50	6.25	6.37½
Zinc, New York	**6.90**	6.85	6.60	6.72½
Lead, St. Louis	**6.72½**	6.70	6.35	5.60
Lead, New York	7.00	7.00	6.70	5.95
Tin (Straight), New York	**42.12½**	41.50	38.50	32.12½
Antimony (Asiatic), N. Y.	7.50	7.50	7.87½	6.25

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price Sept. 11, 1923, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Sept. 4, 1923,	2.775c.
Aug. 14, 1923,	2.775c.
Sept. 12, 1922,	2.412c.
10-year pre-war average,	1.689c.

Composite Price Sept. 11, 1923, Pig Iron, $25.29 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.

Sept. 4, 1923,	$25.38
Aug. 14, 1923,	25.04
Sept. 12, 1922,	31.52
10-year pre-war average,	15.72

running between 50 and 60 per cent of the shipments against their orders.

For still another week there has been no important change in prices of the products making up the major portion of the production. The market is unsettled and rather weak on bolts, nuts and rivets, and shows some irregularity in hot-rolled flats of the sizes going to the automotive industry, while in cold-finished steel bars makers holding at 3.25c. have encountered lower prices in the Middle West. The general firmness of prices is traceable to the adjustment of production to current demands and a belief that the lower rate of plant operations and the elimination of the long work-day will be reflected in substantially higher costs.

Settlement of the anthracite coal miners' strike has been followed by a reaction of coke prices, which has virtually wiped out the recent advance, largely built up on expectations of an extra demand for coke to replace hard coal. A contributing factor in the decline in furnace coke, which is a matter of 50c. a ton, is the blowing out of more blast furnaces in this and nearby districts, where 103 out of a total of 138 will be making iron by the end of this week, as compared with 126 in active production in June.

While there has been some increase in the demand for foundry iron, it has not been sufficient to bring about materially higher prices and the disappearance of a quotation of $24.50, Valley furnace, for No. 2 is due partly to the fact that a furnace interest which took much business at that figure has gone out of production in the past week. The general supply of pig iron still is ample for all requirements, and other furnaces are likely to go out in the adjustment of supply to demand.

It is reported that a good many sheet orders are in the market for Japan, but as a general proposition the effect of the Japanese catastrophe has not been very much felt in this district. It is believed that the flood of inquiries that poured forth a week ago, coming as it did from exporters and brokers, was in anticipation of probable requirements. Local advices are to the effect that cables from Japan up to yesterday were not open for the transmission of commercial messages, and that no accurate idea of even the emergency requirements of the country can now be formed. It is believed that several months will elapse before the real reconstruction needs of the stricken sections will be definitely known.

Pig Iron.—This market has shown a fair degree of activity in foundry iron this past week, although the transactions are large only by comparison with the recent dullness. A sanitary ware manufacturer has bought 1500 tons of No. 2 iron at $25, Valley furnace, and there were several other sales, ranging from a carload to 500 tons, on which in practically all cases the base was $25, Valley furnace. In all, probably 5000 tons of foundry iron has been moved in the past week and in all cases it was for early delivery. Some producers are asking up to $26 for No. 2 foundry, but as far as actual sales are concerned $25 is the top of the market and, seemingly, is the bottom also, with the passing out of production of a Valley furnace interest that has been taking business at less. The promise is of continued improvement in sales of foundry iron, since a large sanitary ware interest whose ordinary requirements are about 5000 tons a month is expected to be in the market for last quarter iron at an early date, while the Westinghouse Electric & Mfg. Co. has put out an inquiry for approximately 7000 tons for its Trafford, Pa., and Cleveland foundries. The Cleveland plant inquiry involves 1200 tons of No. 1, 1150 tons of No. 2 and 1100 tons of No. 2X for fourth quarter shipment, while the inquiry for Trafford calls for 1000 tons each of Nos. 1, 2 and 3 grades, one carload of standard Bessemer iron and a carload of 8 per cent silvery iron. The tonnage for Trafford is for delivery over five months beginning Oct. 1. These inquiries should determine how firm the market is at $25, furnace. There has been only limited trading in the steel making grades. The West Penn Steel Co. recently bought 1000 tons of basic iron at $25, Valley furnace, but important sales of Bessemer iron have been absent. The Union Steel Casting Co. is in the market for 500 tons of Bessemer. Low phosphorus iron has been sold slightly above $32, delivered, Latrobe, Pa., or about $29 f.o.b. Riddlesburg, Pa. It is reported that Valley iron of this grade has been sold as low as $30, furnace. The Carnegie Steel Co. has blown out one Edgar Thomson, and one Newcastle stack since a week ago, and now has 45 of 59 furnaces making iron. It is expected that the Jones & Laughlin Steel Corporation soon will have to suspend the operation of two furnaces for relining. The A. M. Byers Co., Gerard, Ohio, put down its furnace last Saturday. The Top Mill furnace, Wheeling Steel Corporation, was blown out. Claire furnaces, Reliance Coke & Furnace Co., Sharpsville, Pa., will be blown out as soon as present ore supplies are used.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$25.00
Bessemer	26.50
Gray forge	$24.00 to 24.50
No. 2 foundry	25.00
No. 3 foundry	24.00 to 24.50
Malleable	24.50 to 25.50
Low phosphorus, copper free	31.00 to 31.50

Ferroalloys.—Interest in the market again is low following the recent sales of about 1500 tons of ferromanganese at a recession of $5 per ton in the price. This material still is quoted at $112.50, seaboard, for either domestic or imported 80 per cent alloy, but sales are lacking in this district and the common impression is that the next important transactions will be at not over $110. Indeed, that price has been named here without inducing purchases. Outlook still is for reduced steel works operations over the last quarter of the year, with the consequent curtailment of the use of ferroalloys and purchases, which a short time ago appeared to be sufficient only to carry consumers into the quarter now promise to supply all requirements over the remainder of the year. On 20 per cent spiegeleisen, $45, furnace, now is maximum even for small lots. Prices are given on page 709.

Semi-Finished Steel.—The common quotation on billets, sheet bars and slabs here still is $42.50 and the tendency to hold to this price has been somewhat strengthened by the recent sale by a Cleveland producer to a Pittsburgh district strip maker of approximately 30,000 tons of billets and slabs for delivery over the remainder of this year at that figure. Buyers, however, have not abandoned expectations of being able to buy billets for less and on small tonnages for early delivery there have been sales at our minimum quotation. Demand for black sheets is not improving sufficiently to reduce the available supply of sheet bars materially and there is more profit in sheet bars at $41.50 than there is in black sheets at 3.75c., base. Demand for forging billets has not yet reflected the increased activity of the automobile and parts manufacturers and wire rods and skelp still are selling slowly. There is some excess supply of rods, due partly to the unsettled rivet market, which is keeping down specifications from that industry. It is doubtful if the present price of $51, base, could be obtained if makers had to sell a tonnage, the demand is so limited. Prices are given on page 709.

Wire Products.—The trade here is encouraged by a somewhat better inquiry, particularly as the renewed interest of buyers shows fairly strongly in woven fence and barbed wire, which have been extremely dull for several months. Orders do not show a corresponding gain, but manufacturers are hopeful that a turn is near. Order books in most products are low with most mills and early deliveries now are being made on practically all products. Locally, there is close observance of quoted prices, but in the Middle West it is reported that concessions are appearing in fence prices and that the full prices for processed wire have not in all cases been insisted upon. It is expected a good many nail orders will come from Japan for emergency building. Prices are given on page 708.

Steel Rails.—Reports as to the price of light rails rolled from new steel are conflicting, some claiming that 2.25c., base, has not been shaded, while equally convincing testimony is heard that not only has business been done at 2.15c., but also that it has been lost at that price. On attractive orders the market appears to have settled to the latter figure and on these sections rolled from old rails, 1.90c. to 2c., base, is the prevailing range.

We quote light rails rolled from new steel at 2.15c. to 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Hot-Rolled Flats.—The market appears to be holding fairly well on hoops and bands, but leans in buyers' favor on other products under this classification. No considerable trouble is experienced by consumers in securing wide strips at 3c., base, as against 3.15c., the regular quotation, and 2.90c., base, still is being done by some mills on rim stock, on which the regular quotation is 3c. There is a fair run of orders, but buyers generally still are "keeping close to the shore." Prices are given on page 708.

Iron and Steel Bars.—All makers of steel bars are holding firmly to 2.40c., base, although strictly new business is confined very largely to small tonnages for early delivery. Specifications against old orders still are reported good. A light demand does not appear to be having any effect upon iron bar prices.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Structural Material.—Most of the structural jobs coming to local fabricating shops involve small tonnage, and demands upon the mills are correspondingly small. Relatively low bids being made upon structural projects of size indicate that the fabricating companies either have fairly liberal stocks of plain material or have considerable tonnage due them from the mills at less than today's prices. On current business, however, there is no padding of the regular market price. Prices are given on page 708.

Plates.—The situation does not change much except for the fact that shipments against old orders still are running ahead of incoming business, and an increasing number of mills are in a position to take on business for delivery. The regular price of 2.50c., base, Pittsburgh, is well observed. Prices are give on page 708.

Cold-Rolled Strips.—While the general tendency of consumers still is to keep purchasers close to actual requirements and all makers could handle more business than they are booking, competition for orders is not keen enough to produce important recessions from the regular quotations on the regular base of 5c., Pittsburgh.

Bolts, Nuts and Rivets.—The market is very irregu-

lar and rather unsettled on these lines, due largely to the fact that there is more capacity than current demands require. Smaller units, anxious to keep going, are taking business at well below the quotations of the larger producers. Some of the former are naming 60, 10 and 10 per cent off list for large machine bolts, and on nuts as much as 4.25c. off list on hot pressed and 4c. off on cold pressed is being named. Rivet makers are trying to establish a 3c. base for large structural rivets, but it cannot be said that it is a firm price, since buyers were able to secure goodly supplies at that price or less on the old card of extras. The new card is not popular with buyers, the railroads being particularly active in protest. A size of rivets commonly used by the railroads is ⅝ x 2 in., which formerly commanded an extra of 15c. per 100 lb. over base. In the new list there is an extra of 35c. per 100 lb. for diameter and 25c. per 100 lb. for length, an increase of $9 per ton. Prices and discounts are given on page 708.

Track Fastenings.—The need of new business by some makers of spikes is beginning to tell on prices of small sizes, hitherto held at 3.50c., base, but which lately have been offered in the anthracite coal region at the same base as large spikes, or 3.15c. Inquiries for spikes are more numerous than they have been, but there has not been a corresponding gain in orders and old obligations are pretty well filled. For prices, see page 708.

Tubular Goods.—There continues to be heavy pressure upon the mills for shipments on old orders, particularly for standard pipe. Consumption apparently still is heavy, because a considerable portion of the shipments, notably of oil country goods, is going direct to users instead of to jobbers' warehouses. New business is fairly good, but not of a volume to encourage expectations that the present rate of production can be maintained during the remainder of the year. Even now some mills can make shipments so promptly as to suggest exhaustion of order books. Competition for business is keener on the basis of deliveries than on prices. Several inquiries for line pipe and oil well goods for shipment to Mexico and South America are current and call for early delivery. Boiler tube specifications are good, but new demands are light. There are intimations of price cutting in seamless tubes and a vague hint of a general revision of boiler tube prices about the middle of this month. Discounts are on page 708.

Sheets.—Orders show a slow, but pretty steady increase, and there has been a notable increase in specifications from the automotive industry, which also is beginning to place fourth quarter contracts. That industry is getting into smoother operation on the 1924 models. Only by a considerable stretch of imagination, however, could the general market be called active. While manufacturers, who have to buy their steel insist that 3.75c., base, for black sheets means no more than a new dollar for an old one at $42.50 for sheet bars and that even 3.85c. nets less than 5 per cent gross profit, the lower figure has not entirely disappeared. Buyers do not appear seriously impressed with the possibility of an early advance in prices and are governing purchases accordingly. The leading interest, which opened its books for fourth quarter business last Thursday, has not yet filled up for that period; when it opened its books for the present quarter it filled them in about 24 hours. The attitude of consumers has changed considerably since last April and prices will be governed more by the law of supply and demand than by producing costs. Cables from Japan not yet being open for business use no very clear line on the requirements of that country in its emergency reconstruction can be had. Prices are given on page 708.

Tin Plate.—The leading interest is sold out for the last quarter of the year and the independent makers largely so. Specifications for November shipments are due next Saturday and should disclose whether the consumers have requirements for all the tin plate contracted for. Few makers have any considerable tonnage available for shipment during the last quarter, and only small and broken lots of stock items for prompt delivery. The effect of the Japanese disaster in the tin plate market will probably be greatest in extra demands for material for meat and milk containers, these foods being the most urgent need of the stricken people.

Cold-Finished Steel Bars and Shafting.—Locally, there is firm adherence to the quoted base of 3.25c., Pittsburgh, for carload lots, but makers are reported to be encountering rather sharp competition in the Chicago district, where makers are understood to have gone as low as 3c., Pittsburgh, in an effort to secure desirable accounts. Business is better with local makers, due chiefly to larger specifications and orders from the automotive industry. Other consuming industries still are buying sparingly. Ground shafting holds at 3.65c., base, f.o.b. mill, for carload lots.

Coke and Coal.—Settlement of the anthracite coal miners' strike has been followed by a considerable modification of producers' price ideas on coke. Furnace grade, not available a week ago below $5 per net ton at oven, now is freely offered at $4.75, and actually has been sold as low as $4.50, the latter price prevailing on 75 carloads to a local steel company. There has also been a drop of from 25c. to 50c. a ton in foundry coke, which for prompt delivery now is quotable from $5.75 to $6.50, as against $6 to $7 a week ago. Contracts for fourth quarter furnace coke aggregating somewhat above 100,000 tons a month are reported to have been concluded at $5 per net ton at ovens. Some of the tonnage, however, has been contracted for as a measure of protection. The coal market has also weakened slightly with the termination of the anthracite strike. Prices are not materially lower except on slack grade, which is down to $1.20 at mines for steam and $1.40 for gas grade. Mine run steam coal still is quoted at $2.15 to $2.40, and mine run gas and coking coal from $2.25 to $2.35.

Old Materials.—There is no occasion to materially alter the prices of a week ago. Steel makers still show no interest in fresh supplies; the foundries are buying only moderately and, as for the past few weeks, trading has been largely between dealers. Relatively high prices ruled on this month's offerings of scrap by the Pennsylvania Railroad, which brought $19.30 per gross ton for heavy melting steel, $23 to $23.50 for the specialties, $20.15 for No. 1 rails and $16 for borings. Dealers secured all of the offerings and were prompted to go high in their bids by the fact that a Youngstown district steel plant recently began accepting shipments on old and high-priced contracts. It is believed that most of the high-priced orders have been filled or that the material is available in dealers' yards to fill them. With dwindling steel mill order books brought about by the fact that shipments for some time have been exceeding new business, the outlook is for a lower rate of steel works operations and a smaller consumption of scrap. Furthermore, most of the steel companies have unusually big stocks of pig iron, which would be drawn upon in the event that scrap advances much. Such strength as the market shows, therefore, is merely a surface and not a fundamental condition. There is real weakness in compressed sheets. Norfolk & Western Railway will receive bids until noon Sept. 12 on 22,862 gross tons of scrap, and the Baltimore & Ohio Railroad list, which embraces 21 cars and 10,460 gross tons, closes at noon Sept. 17.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$18.00 to $18.50
No. 1 cast, cupola size	22.00 to 22.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 20.00
Compressed sheet steel	16.00 to 16.50
Bundles, sheets, sides and ends	14.50 to 15.00
Railroad knuckles and couplers	22.50 to 23.00
Railroad coil and leaf springs	22.50 to 23.00
Low phosphorus bloom and billet ends	24.50 to 25.00
Low phosphorus plate and other material	23.50 to 24.00
Railroad malleable	19.00 to 19.50
Steel car axles	21.50 to 22.00
Cast iron wheels	19.00 to 19.50
Rolled steel wheels	22.50 to 23.00
Machine shop turnings	13.00 to 13.50
Sheet bar crops	21.00 to 21.50
Heavy steel axle turnings	15.50 to 16.00
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	19.00 to 19.50
Stove plate	15.50 to 16.00
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	18.00 to 18.50

Chicago

Most Consumers Buying From Hand to Mouth—More Rail Orders

CHICAGO, Sept. 11.—Outside of additional rail orders amounting to 30,000 tons, purchases of finished steel during the week have been restricted. Heavy shipments continue to reduce the backlogs of the mills and now that satisfactory deliveries are available, consumers appear to be disposed to buy from hand to mouth. It is notable, however, that stocks in hands of consumers are thoroughly deflated and it is therefore expected that current purchases for short periods ahead will form an imposing aggregate tonnage. This view is based on the fact that consumption of steel is fairly well maintained, although some users are less insistent on deliveries than heretofore and a few of them have asked for the holding up of shipments.

The gradual decline in building activity is not surprising in view of high labor costs; the surprising feature is that it has slackened so gradually. Oil storage tank buying, on the other hand, has stopped abruptly, but past experience would indicate that it may be resumed just as unexpectedly. Railroad car buying is still at a low ebb. Other factors in the industrial situation are practically unchanged. Automobile production is still ahead of previous records for the same period of the year and general manufacturing operations are holding up well. The notable exception is the implement industry, which has been operating at a restricted rate for some time. On the whole, no radical changes in the market situation are expected this fall, although some observers believe that the advantage will be increasingly in favor of the buyer as winter approaches. Thus far there has been no pronounced increase in inquiries such as would forecast a heavy fall buying movement. The most important source of new demand has been Japan, which has entered the market for large quantities of sheets, nails and wire for the restoration of the area devastated by the earthquake.

Two hard steel bar mills have temporarily suspended production, but otherwise mill and blast furnace operations in this district are substantially unchanged.

Pig Iron.—A second cargo of Susquehanna iron from Buffalo, consisting of 1700 tons of foundry ranging from 2.75 to 3.25 per cent silicon, is expected to arrive at Milwaukee Friday, Sept. 14. Still another shipment will probably be made. On the whole, current buying is of a hand-to-mouth character and with the coal strike settled, buyers have recovered confidence in their ability to dominate the market. Some of the larger users, however, are placing substantial orders. A Wisconsin melter is inquiring for 3000 to 4000 tons of foundry for 30 to 60-day delivery. A local plant wants 2000 tons for September and October shipment and a railroad is in the market for 800 tons of foundry for delivery over the remainder of the year. A western Michigan melter has closed for 2000 tons of malleable both for shipment over the remainder of the year. It is understood that both of these orders went to Lake Erie furnaces. Both Detroit and Toledo producers are quoting $25 base, furnace, which enables them to penetrate far into what is normally Chicago territory. Local prices are fairly steady, but a sale at $26.50 base is reported to have been made at Milwaukee. On the other hand, one of the Milwaukee stacks which had been quoting $27 base, furnace, has announced an advance to $28. This figure is equal to the delivered price at Milwaukee from Chicago furnaces, but puts the Milwaukee stack at a disadvantage to the extent of the local switching charge from furnace to user. Outside of a few small sales of Southern iron for shipment by barge and rail, little Southern product is being disposed of in this section. Stocks in Southern furnace yards are said to be large, according to some estimates amounting to close to 100,000 tons. With so much iron piled some producers are changing their views of prices. At least two Southern stacks are now quoting $23 base, Birmingham. A local inquiry calls for 50 to 100 tons of low phosphorus. A sale of 250 tons of silvery has been made in Wisconsin at the Jackson County schedule and several carlot orders are also reported. Charcoal is quiet.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$32.04 to $32.15
Northern coke, No. 1, sil. 2.25 to 2.75	27.50
Northern coke, foundry No. 2, sil. 1.75 to 2.25	27.00
Malleable, not over 2.25 sil.	27.00
Basic	27.00
High phosphorus	27.00
Southern No. 2	28.65 to 30.01
Low phos., sil. 1 to 2 per cent, copper free	34.00 to 35.00
Silvery, sil. 8 per cent	39.29

Ferroalloys.—There has been increasing interest in ferromanganese and a sale of 150 tons has been made at $112.50, seaboard, which is now the ruling market. A number of inquiries for ferromanganese are pending. A Michigan melter is inquiring for 100 tons of spiegeleisen.

We quote 80 per cent ferromanganese, $120.06 to $120.88, delivered; 50 per cent ferrosilicon, $85 to $87, delivered; spiegeleisen, 18 to 22 per cent, $50.80, delivered.

Plates.—With buying of railroad cars and oil storage tanks at a low ebb, the two heaviest sources of plate business are contributing little to current mill bookings. New car inquiries which have reached Western car builders during the week do not involve more than 4500 tons of steel, and no orders or inquiries for tanks are reported. Mill shipments continue to exceed new business.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—Saginaw, Mich., has placed 125 tons with the National Cast Iron Pipe Co., and Chicago has awarded 860 tons to the United States Cast Iron Pipe & Foundry Co. Lincoln Park, Mich., took bids from general contractors yesterday on 700 tons, while Lake County, Ohio, received tenders on 1200 tons of 4- to 12- in. inclusive on the same date. St. Paul takes bids today on 425 tons of 6- to 16-in. Prices show little change, although slightly easier on the larger sizes.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $57.20 to $59.20; class A and gas pipe, $5 extra.

Sheets.—Inquiries thus far received from Japan involve 6000 tons, about equally divided between galvanized and black sheets, and it is expected that this total will be increased to 20,000 or 30,000 tons within the next 30 days. The first efforts of the Japanese will be directed toward the building of light temporary structures which will require large quantities of sheets. The use of sheets for sheathing these buildings is dictated both by fire restrictions in large cities and by fear of cholera. The dread disease is transmitted by rats, and as a protection against them the Japanese drive sheet foundations into the wet subsoil under which the rodents will not burrow. An important feature of the current Japanese demand is the inquiry for galvanized sheets. Under normal conditions the tonnage of galvanized sheets imported into the islands is small, owing to the high protective duty, which will probably be suspended in view of the present urgent demand. The tremendous destruction of buildings would naturally cause a large increase in demand for sheets and spelter, and it is doubtless true that stocks of spelter and galvanizing plants were destroyed in the earthquake zone in which about 25 per cent of the very large galvanizing capacity of the country is located. The action of the leading sheet producer in opening its books for fourth quarter at unchanged prices caused no surprise. Other mills are generally holding to the same quotations, although black sheets are more freely available from smaller producers at 3.75c., base Pittsburgh. Domestic demand is not active, but consumption appears to be well maintained. Refrigerator manufacturers are operating at 100 per cent of capacity and expect to continue at that rate through the fall and winter in prepa-

ration for next year's trade. Hot air furnace makers are also very busy.

Mill quotations are 3.75c. to 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Bolts and Nuts.—The announcement of the advanced list prices has had the effect of bringing in heavier specifications against third quarter contracts on which the old list prices prevail. Little fourth quarter contracting has been done thus far.

Bars.—Mill shipments of soft steel bars are still heavy, although some buyers are not so insistent on deliveries as earlier in the year, and in a few instances requests for the suspension of shipments have been received. New business is not heavy, but mills find encouragement in the receipt of a number of inquiries for first quarter. Bar iron continues weak with the ruling market at 2.40c., Chicago, although some orders are moving at both below and above that figure. Rail steel bars remain firm at 2.30c., mill, but the dearth of new business has had an adverse effect on operations. The Moline mill of the Republic company has shut down until the end of the month, and the Calumet plant at Chicago Heights has been idle for a week and will not resume again until next Monday. A decline in reinforcing bar business is responsible, in part, for the condition of the rail steel market. While good-sized reinforcing projects continue to be undertaken, the large number of small jobs which make up the volume of tonnage earlier in the year are lacking. The farm implement industry, another large user of hard steel, is taking little tonnage at present.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Rails and Track Supplies.—Two rail orders placed by Western roads during the week aggregated 30,000 tons. The Chesapeake & Ohio and Hocking Valley inquiries for standard section rails are still pending. There is little activity in light rails. The Great Northern Railway is inquiring for 1000 tons of 90-lb. and 1000 tons of 130-lb. rails for delivery in the first quarter of 1924, and also asks for prices on 2675 tons of tie plates, with the stipulation that delivery must be guaranteed one-half in the first quarter and the balance in the second quarter of 1924. The Canadian National Railways has placed 2300 tons of rails with the Illinois Steel Co. for its American lines.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts, 4.90c. base.

Structural Material—Locally there is approximately 20,000 tons of fabricated steel work pending and elsewhere in this territory there is also a round tonnage undisposed of, but on the whole the demand for structural steel appears to be on the wane. There is no doubt that high labor costs are having a discouraging effect on new buildings and that some contemplated work is being delayed or postponed. Ore docks for the Great Northern at Duluth, involving 2300 tons, have been indefinitely posted. On the other hand, a new local project, the Sheridan Trust & Savings Bank Building, will require 3500 tons. Demand for heavy steel from Japan is not expected to be fully felt for some time, as initial efforts no doubt will be concentrated on the erection of temporary structures. Nevertheless, Japanese inquiries thus far received involve 20,000 tons of structural shapes, bars and plates.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—Demand for nails from Japan is heavy, and it is estimated by the trade that fully 20,000 tons or the equivalent of 400,000 kegs, will be bought for use in putting up temporary structures in the earthquake zone. Substantial inquiries for galvanized wire as well as wire rods have also been received from Japan. Domestic demand is also improving, both inquiries and specifications being heavier. Greater interest is shown in fencing and barbed wire. Spring terms on fencing have been announced and some orders have been placed. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 708.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.80 per 100 lb.; cement coated nails, $3.25 per keg.

Reinforcing Bars.—The volume of prospective business is increasing, as is generally the case at this season of the year, and a number of large new projects are being figured on. The week also brought out a number of good-sized lettings, some of which were closed only after keen competition. Although some of the work let earlier in the year has been held up at the instance of investment bankers, prospects for building activity during the fall months are regarded as generally favorable. Lettings include:

John Marshall High School building, Minneapolis, Minn., 600 tons to Fleischer Construction Co.

Elks club-house, Milwaukee, 700 tons to Corrugated Bar Co.

Franklin Street School, Milwaukee, 200 tons to Corrugated Bar Co.

Fair Store basement, Chicago, 400 tons to Joseph T. Ryerson & Son.

Addition to Hotel Retlaw, Fond du Lac, Wis., 100 tons to Corrugated Bar Co.

Hoffman Building, Chicago, 125 tons to Barton Spiderweb System Co.

Illinois road work, 100 tons to Concrete Steel Co.

Pending business includes:

Perry Creek Conduit, Sioux City, Iowa, 700 tons.

United States Reclamation Service, Denver, Colo., 300 tons.

High school, Mishawaka, Ind., 175 tons.

Midwest Utilities Co. power house, Tulsa, Okla., 100 tons.

Old Material.—There is practically no consumer demand except for cast and malleable grades, which are notably stronger, and brokers' ideas are decidedly less bullish than a week ago. While dealers are still paying from $16.50 to $17 for heavy melting to cover their short sales, they are doing no speculative buying. Prices of the various grades listed below show little change, but if sentiment is any gage of the future, the next general turn will be downward. Railroad lists include the Illinois Central, 10,000 tons; the Baltimore & Ohio, 11,000 tons; the Northern Pacific, 3600 tons, and the Chicago & Eastern Illinois, 800 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$21.50	to $22.00
Cast iron car wheels	19.50	to 20.00
Relaying rails, 56 and 60 lb.	28.50	to 29.50
Relaying rails, 65 lb. and heavier	32.00	to 35.00
Rolled or forged steel car wheels	22.00	to 22.50
Rails for rolling	17.50	to 18.00
Steel rails, less than 3 ft.	20.50	to 21.00
Heavy melting steel	16.50	to 17.00
Frogs, switches and guards cut apart	17.00	to 17.50
Shoveling steel	16.25	to 16.75
Drop forge flashings	11.50	to 12.00
Hydraulic compressed sheets	13.00	to 13.50
Axle turnings	13.50	to 14.00
Steel angle bars	18.50	to 19.00
	Per Net Ton	
Iron angle and splice bars	22.50	to 23.00
Iron arch bars and transoms	22.50	to 23.00
Iron car axles	25.50	to 26.00
Steel car axles	18.00	to 18.50
No. 1 busheling	13.50	to 14.00
No. 2 busheling	10.00	to 10.50
Cut forge	15.00	to 15.50
Pipes and flues	10.00	to 10.50
No. 1 railroad wrought	16.00	to 16.50
No. 2 railroad wrought	15.00	to 15.50
Steel knuckles and couplers	19.50	to 20.00
Coil springs	20.50	to 21.00
No. 1 machinery cast	19.50	to 20.00
No. 1 railroad cast	18.50	to 19.00
No. 1 agricultural cast	18.50	to 19.00
Low phos. punchings	17.50	to 18.00
Locomotive tires, smooth	16.00	to 16.50
Machine shop turnings	9.00	to 9.50
Cast borings	11.00	to 11.50
Short shoveling turnings	11.00	to 11.50
Stove plate	16.50	to 17.00
Grate bars	14.50	to 15.50
Brake shoes	15.00	to 15.50
Railroad malleable	19.50	to 20.00
Agricultural malleable	17.50	to 18.00

New York

Structural Steel Continues Strong—Pig Iron Very Dull

NEW YORK, Sept. 11.—The only inquiry of importance which has been pending in this market for the past two weeks was from the American Tube & Stamping Co., Bridgeport, Conn., for from 4000 to 5000 tons of basic for last quarter delivery, and it was withdrawn last week, but the company afterward placed an order for 3000 tons and may buy 2000 more. Aside from this transaction, the market has been almost lifeless. The settlement of the anthracite strike has caused buyers to look for lower prices and to stay out of the market. The result is that quotations are nominal, but it seems very probable that on a tonnage of fair size about $24.50, eastern Pennsylvania, could be done on No. 2 foundry and that Buffalo iron would be sold on the same basis. The indifference of buyers as to prices is shown in the case of a small tonnage of Southern iron which has been offered for resale on a basis of about $20, Birmingham, and has gone begging. Virginia iron at the nominal quotation of $26, furnace, which has prevailed for some time, cannot be sold, and the few Virginia furnaces in operation are piling their iron with the prospect of going out of blast at an early date.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$28.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.27
East. Pa. No. 2, sil. 1.75 to 2.25	27.27
Buffalo, sil. 1.75 to 2.25	29.41
No. 2X Virginia, sil. 2.25 to 2.75	31.94
No. 2 Virginia, sil. 1.75 to 2.25	31.44

Ferroalloys.—The British official price of ferromanganese is still $117.50, and some carload lots have been sold at that figure, but $112.50 prevails on resale lots of both domestic and foreign production, and even lower prices have been named. In the spiegeleisen market, there have also been sales of carload lots for which the quotation is $47.50, furnace, with $45, furnace, asked for large lots. No changes are noted in the ferrosilicon or ferrochromium markets, which continue quiet with demand light.

Cast Iron Pipe.—Inquiries are in good volume, though few are for large tonnages. Firmness continues and makers of pressure pipe are booked for several months. One dealer is turning away orders on large sizes. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $63.60; 4-in. and 5-in., $68.60; 3-in., $78.60, with $5 additional for Class A and gas pipe. New life appears in the soil pipe market as prospects loom up for needs in construction work. Prices are unchanged and demand is good. It is believed in some quarters that if the winter is mild the seasonal falling off in demand will be slight. One maker is declining orders for deferred shipment. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, for prompt shipment, as follows: 6-in. standard, 34½ to 35¾ per cent off list; heavy, 44½ to 45¾ per cent off list.

Warehouse Business.—Thus far September is generally reported by warehouses in this district as a quiet month. Good deliveries from the mills are noted and in some products dealers claim that the mills are apparently anxious for business. Black and galvanized sheets continue firm with the volume of business transacted at about the same level as in July and August. Probably the majority of sales today are made on a basis of 4.75c. per lb. for No. 28-gage black and 5.75c. per lb. for galvanized sheets. A fair demand for bars is evident and sellers of spring steel report a fairly active market. Wrought iron and steel pipe are quiet, but prices are still firm. No change is reported in prices on brass and copper products. We quote prices on page 732.

Finished Iron and Steel.—Fair activity in structural steel is the only outstanding feature of the local steel situation. A good deal of the projected work is for commencement in the fall, so that the closing of contracts is expected to proceed without undue delay. The work is largely in public schools, loft buildings and apartments, a greater number of the latter being figured on since the prospect of any early lowering of rentals has practically disappeared. Aside from structural activity there is very little large steel tonnage up for consideration. Orders being put on mill books are mostly carload lots for early shipment, with a sprinkling of fourth quarter contracts of moderate size, mostly from jobbers. Large steel consumers who depend primarily upon Steel Corporation companies for their steel are getting deliveries on old contracts at such a full rate that their current requirements are made up of small fill-in lots. Some of the independent mills are in need of tonnage, particularly in plates, shapes and bars. Specifications in hand and orders coming in are better in the lighter forms of steel. Prices are firm on practically every item. Buyers have apparently given up thought of any reductions to come this year, yet there is no anxiety to cover for fourth quarter. The Norfolk & Western Railroad, which recently closed for 50,000 tons of rails for 1924, is now inquiring for 10,000 tons of tie plates. The New York, Ontario & Western is out for its 1924 rail requirements, probably 3000 to 5000 tons. The recent inquiry of the Standard Oil Co. of New Jersey for 10,000 tons of steel for oil tanks temporarily has been withdrawn. The largest active structural job is a bridge over the Raritan River at Perth Amboy, N. J., requiring 6000 tons, on which bids close today (Tuesday).

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Coke.—The coke market has declined in price and is less active following the agreement of anthracite miners and operators. While foundry coke had reached a range of from $6 to $6.50 for prompt carloads, just prior to the expected strike, and standard furnace coke was at $5 to $5.50 per ton, the present market for prompt shipment is $5.75 to $6.25 for standard foundry coke and $4.25 to $4.50 for standard furnace. Consumers are evidently holding off further purchases as long as possible, expecting a further recession. By-product is quoted $11.41, Newark and Jersey City.

Old Material.—The market continues to show a stronger tendency on most grades, although demand is not reported particularly heavy. No. 1 heavy melting steel is now bringing $16.50 per ton, delivered to eastern Pennsylvania consumers, and in one instance, shipments to Pottsville, brokers are reported paying $17 per ton on strictly No. 1 heavy melting steel. Cast borings and machine shop turnings are strong, with the former bringing up to $15.50 per ton delivered eastern Pennsylvania consumers and the latter about $14.50 per ton. Specification pipe is unchanged at $16 per ton delivered Lebanon. Stove plate is firm and in the case of New Jersey foundries, although generally bringing $18 per ton delivered, is said to be sometimes up to $18.50 per ton. This grade is quotable in New York at $15.50 to $16 per ton, based on the prices offered for the nearby deliveries. A lower price is offered by brokers shipping to Harrisburg, Pa., as a result of the higher freight rate.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.50 to $13.00
Steel rails, short lengths, or equivalent	13.25 to 13.75
Rails for rolling	15.00 to 17.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	19.00 to 20.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	11.00 to 12.00
Machine-shop turnings	10.25 to 10.75
Mixed borings and turnings	9.50 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	11.75 to 12.25
Stove plate	15.50 to 16.00
Locomotive grate bars	12.50 to 13.50
Malleable cast (railroad)	18.00 to 19.00
Cast-iron car wheels	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	17.00 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Cincinnati

Low Prices Attributed to Lake Furnaces—Moderate Buying of Pig Iron

CINCINNATI, Sept. 11.—Pig iron sales generally run from carloads to lots of 200 tons, and the market is still dull. There were, however, a number of round-lot sales during the past week. A nearby melter bought 1000 tons of Southern iron, not strictly of foundry grade, at a price reported to be less than $23, Birmingham, but the circumstances of the sale and the fact that no more of this iron is available would leave this deal out of all calculations as affecting the market price. The Southern market can still be quoted at $23.50, but a small tonnage of resale iron is available at $23. Birmingham furnaces have not yet receded from the $24 price, but a test of the market has not been made recently and it is difficult to say just what could be done on a round tonnage. In the North, $25 continues minimum in the southern Ohio district, but lake furnaces are reported to be offering iron in this district on a basis of $24.50. In fact, an Indiana melter is reported to have placed an order with a Cleveland furnace for 1000 to 2000 tons for fourth quarter on the basis of $24.25, furnace, or the equivalent of $24.50, Ironton. Another Indiana melter bought 500 tons of foundry at $25, base Ironton. On an inquiry for first half of next year, a southern Ohio furnace has, it is understood, quoted $25, base. Inquiries are scarce, though the Westinghouse Electric & Mfg. Co. is in the market for 6500 tons, and a Bucyrus melter for 1500 tons for last quarter of this year and first quarter of next. There is no inquiry for basic and very little for silvery.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.05
Ohio silvery, 8 per cent	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	27.27
Basic Northern	27.27
Malleable	27.27

Sheets.—Naming of fourth quarter prices by the American Sheet & Tin Plate Co. has had the effect of reassuring buyers of sheets and tin plate, some of whom had the idea that higher prices would be named on account of the inauguration of the 8-hr. day at the mills. Some good-sized orders have already been placed for fourth quarter delivery. Concessions of $2 per ton on blue annealed and galvanized sheets, as well as black, are reported to have been made by some of the smaller mills needing business.

Structural Material.—A little more activity is noted. Highway bridges in Indiana requiring 800 tons will probably be awarded today. Bids have been taken on a factory building for the Fibre Conduit Co., Richmond, Ind., involving 300 tons, and it is said that the work will be awarded to an Indianapolis fabricator. The Rowland office building, Columbus, Ohio, will probably be awarded this week. C. A. Koerner & Co., Louisville, Ky., have been awarded the general contract for the Kosair Temple, Louisville, involving 450 tons.

Warehouse Business.—Local jobbers report a slight improvement in the demand, though orders continue to be for very small tonnages. Stocks generally are in good shape. Prices are unchanged.

Finished Materials.—Orders continue small, and for immediate delivery. Indications point to a fair demand for plates arising in the near future, as tank builders are figuring on a number of projects that involve considerable tonnages. Specialties continue in fair demand, and some carload sales of track accessories, car wheels, boiler tubes and such items are reported. There is little activity in wire products, and mills report that jobbers and manufacturers are not specifying very heavily against contracts. New business is light. Some jobbers are apparently endeavoring to develop lower prices on plain wire and wire nails, but there is no indication of their being successful. Concessions can still be had in bolts and nuts, but despite these inducements orders are light. A report is current that considerably less than the published price of 3.15c. has been quoted by a northern Ohio mill on hoops and bands. Prices on all products are holding fairly well, but there is a disposition on the part of buyers to wait as long as possible before contracting for fourth quarter, they apparently feeling that it will be to their advantage to do so. Very prompt deliveries can be made by mills on practically all products.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—An upturn in coke prices is noted, the advances being made by operators who had been quoting lower figures to bring them in line with the general market. Some sizes of domestic fuels have been advanced 50c. to $1, but on the whole the market is about the same as last week. Foundry and furnace cokes are in fair demand, with domestic sizes moving better than for some time.

Old Material.—The scrap market remains about the same as last week, practically all the activity being traced to dealer trading. A steel company in the district is buying some sheet clippings, on which it has advanced its price about 50c., but this is the only activity of note. Cast grades are quiet. Offerings are large, the Norfolk & Western alone offering 35,000 tons, on which bids will close this week. Prices generally are unchanged.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.50 to $14.00
Iron rails	16.00 to 16.50
Relaying rails, 50 lb. and up	29.00 to 29.50
Rails for rolling	17.00 to 17.50
Heavy melting steel	15.50 to 16.00
Steel rails for melting	15.50 to 16.00
Car wheels	15.50 to 16.00
Per Net Ton	
No. 1 railroad wrought	13.50 to 14.00
Cast borings	10.00 to 10.50
Steel turnings	9.50 to 10.00
Railroad cast	17.00 to 17.50
No. 1 machinery cast	19.50 to 20.00
Burnt scrap	12.50 to 13.00
Iron axles	22.50 to 23.00
Locomotive tires (smooth inside)	14.50 to 15.00
Pipes and flues	9.50 to 10.00

Boston

Disregard of Pig Iron Differentials Noted—More Scrap Inquiries

BOSTON, Sept. 11.—More eastern Pennsylvania interests have advanced from $25 furnace to $25.50, with No. 2X now $26 and No. 1X $27, and claim to have closed business at the new prices. On the other hand, a Meriden, Conn., builders' hardware manufacturer, in the market for 500 tons fourth quarter No. 1X, bought eastern Pennsylvania at $26, furnace, while another Connecticut foundry bought 500 tons, silicon 3.25 to 3.75, fourth quarter, at $26. Small sales of No. 2X, prompt shipment, are reported at $26, and iron is offered in western Massachusetts at $24.50 base. On western Pennsylvania $24 furnace base has been done. Buffalo No. 1X sold the past week in Connecticut at $25 furnace, and a Vermont foundry took part of 900 tons on the same basis. A New York furnace is reported to have taken the rest of the Vermont business at a delivered price under Buffalo. As previously reported, Alabama furnaces have dropped from $27 to $24 furnace base, with limited sales at the new price. Virginia iron is not a factor, being considerably out of line with others. Business is better in New England, but by no means active, most of it for fourth quarter delivery.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	$29.15 to $29.65
East. Penn., sil. 1.75 to 2.25	28.65 to 29.15
Buffalo, sil. 2.25 to 2.75	29.01 to 29.91
Buffalo, sil. 1.75 to 2.25	29.01 to 29.91
Virginia, sil. 2.25 to 2.75	32.42 to 32.92
Virginia, sil. 1.75 to 2.25	31.92 to 32.42
Alabama, sil. 2.25 to 2.75	33.60 to 34.10
Alabama, sil. 1.75 to 2.25	33.10 to 33.60

Structural Steel.—Steel mills are actively seeking business, but most fabricators are well covered and not disposed to make further commitments due to the drop in construction. One mill continues to quote structural steel at 2.40c., Pittsburgh base, but 2.50c. is the general asking price. No large tonnages were booked by fabricators the past week, and no important business is in immediate prospect. The movement of plain material out of warehouse stocks is moderately large, but individual orders in most instances do not exceed five tons.

Coke.—New England producers of by-product foundry coke are still quoting on a basis of $13.50 delivered. Deliveries against contract specifications have fallen still further behind, and with demands for domestic fuel very pressing, producers find themselves in about the same position experienced a year ago. Connellsville 72-hr. foundry coke is offered on a delivered basis of about $1 under local fuel, and foundries, especially in Connecticut, are showing more interest. Iron melters are taking increasing quantities of crushed coke not only from New England, but outside makers as well. Liberal sales of 48-hr. Connellsville coke at approximately $12 delivered were made to New England gas companies the past ten days or so, but such buying has quieted down somewhat.

Old Material.—Sentiment in old material circles is more optimistic, and more inquiries have come into the market the past few days. Now that the coal strike question has been settled, the trade expects an increase in actual bookings. During the past week, however, business was mostly between dealers, the largest endeavoring to accumulate supplies. Prices remain unchanged. A small amount of nonferrous material will be sold at public auction, together with much other material, by the government, at Squantum, Quincy, Mass., Tuesday, Sept. 18.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.50 to $23.00
No. 2 machinery cast	20.50 to 21.00
Stove plate	16.00 to 17.00
Railroad malleable	21.00 to 21.50
Street car axles	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.50
No. 1 rail wrought	13.50 to 14.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe (1-in. in diam., over 2 ft. long)	11.00 to 11.50
Machine shop turnings	8.50 to 9.00
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00

St. Louis

Light Buying of Pig Iron—Railroad Scrap Lists Are Heavy

ST. LOUIS, Sept. 11.—Buying of pig iron by melters in this district was less this week than for several weeks past. Melters for the most part seem wary of the market, and are generally buying only hand to mouth. The biggest sale of the week was of 1000 tons of basic made by the St. Louis Coke & Iron Co. to a melter in the district for prompt shipment. The same company sold 100 tons of foundry iron and about 200 tons in carload lots. The biggest inquiry before the market is from an Illinois melter for 200 to 500 tons of foundry iron for last quarter; other inquiries are mostly for carloads. Northern iron is still being sold on the basis of $27, Chicago. Quotations have been made as low as $23.50, Birmingham, for Southern iron, with the price ranging up to $24. A carload of spiegeleisen was sold in this market, and there is an inquiry for 100 tons of Bessemer ferrosilicon.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.15 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$29.16
Northern malleable, sil. 1.75 to 2.25	29.16
Basic	29.16
Southern fdy., sil. 1.75 to 2.25	$28.67 to 29.17

Finished Iron and Steel.—The market for all finished material is very quiet. No new work has been placed with fabricators here for several weeks, and trade in structural steel is dull. Jobbers are buying very little. A Texas jobber bought a carload of washers, and another jobber in that State bought a carload of nails. Railroad inquiries are very light.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, ⅞ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—Before the reaching of an agreement at Harrisburg, the anthracite situation strengthened the position of coke, and Connellsville grades advanced 25c. within the last week, sales being made at $6.75 to $7.75 at the ovens. Domestic coke is in better demand, the St. Louis Coke & Iron Co. selling 1000 tons for early shipment.

Old Material.—Dealers continue to buy at good prices all railroad lists offered, and these lists continue to be heavy. However, dealers are delaying shipments as much as possible and are taking only such purchases as it is absolutely necessary to move. The result is that stocks in hands of dealers generally are low. Consumers still are out of the market except for a few specialties. Prices are unchanged. New railroad lists include: Norfolk & Western, 30,000 tons; Illinois Central, 9000 tons; Mobile & Ohio, 2200 tons; Missouri Pacific, 2300 tons; Union Pacific, 1000 tons; Kansas City Southern, 350 tons, and Pullman Co., 300 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$16.00 to $16.50
Rails for rolling	18.00 to 18.50
Steel rails less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under	26.00 to 27.00
Relaying rails, 70 lb. and over	33.50 to 34.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	17.50 to 18.00
Per Net Ton	
Heavy axles and tire turnings	12.50 to 13.00
Steel angle bars	15.25 to 15.75
Iron car axles	25.00 to 26.00
Steel car axles	21.00 to 21.50
Wrought iron bars and transoms	20.00 to 21.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	16.50 to 17.00
Railroad springs	19.50 to 20.00
Cast iron borings	12.00 to 12.50
No. 1 busheling	16.75 to 17.25
No. 1 railroad cast	19.00 to 19.50
No. 1 machinery cast	19.00 to 19.50
Railroad malleable	17.50 to 18.00
Machine shop turnings	11.50 to 12.00
Champion bundled sheets	8.00 to 8.50

Birmingham

Reduction in Price of Pig Iron Does Not Result in Much Buying

BIRMINGHAM, ALA., Sept. 11.—Inquiries for pig iron are a little more numerous and sales are aggregating better in the Birmingham district, though furnace interests cannot say that the make is being sold. With the lower quotation, $24 per ton, No. 2 foundry, there was some inducement offered for more buying. Some melters, however, are seeking even further concessions, but furnace interests assert that cost of production does not permit much lower prices. Some off-grade irons were sold recently and a report was current that lower prices for pig iron were made. One of the smaller companies is out of the market entirely through the remainder of the year. Another company is seeking no business but meeting demands of regular customers at prevailing quotations. The other makers, with the exception of the Tennessee Coal, Iron & Railroad Co., are taking on business as it is offered at prevailing prices. One of these interests the past week announced sales for the day aggregating 1000 tons, which is more than half of its production. Alabama surplus stocks on Sept. 1 amounted to 99,961 tons, of which 76,426 tons were sand cast, 8109 machine cast, 250 tons warrant

and 15,176 basic. The stocks on Aug. 1 in this district amounted to 83,934 tons, of which 57,985 tons were sand cast, 12,185 machine cast, 500 warrant and 13,264 basic. Two companies announced that during the next 30 to 40 days their entire surplus stock will be removed.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$23.50 to $24.00
Basic	24.00
Charcoal, warm blast	33.00 to 34.00

Cast Iron Pipe.—Lettings are being received by the three pressure pipe companies of this district every week. The American Cast Iron Pipe Co. for the week announced 194 tons for Birmingham, Ala., and 121 tons for Los Angeles, Cal. The United States Cast Iron Pipe & Foundry Co. has 525 tons for Santa Barbara, Cal., and the National Cast Iron Pipe Co. has a few small tonnage lettings. Specifications are being bid on which hold out promise for several thousand tons.

Coke.—The coke market in the Birmingham district is steadying, though quotations are a little weak, around $8 per ton for foundry coke. Production has not been disturbed. The Alabama By-Products Corporation has made a contract with the Industrial Gas Corporation for by-product gas to be piped to North Birmingham and East Birmingham for manufacturing purposes. The American Cast Iron Pipe Co. has contracted for use of this gas.

Old Material.—No improvement is noted in the scrap iron and steel market in this section and all prices are uncertain, as well as weak. Melters of scrap have informed scrap dealers that some iron is being purchased at almost the prices asked by the old material dealers.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Old steel rails	$16.00 to $18.00
No. 1 steel	14.00 to 16.00
No. 1 cast	20.00 to 21.00
Tram car wheels	20.00 to 21.00
Car wheels	19.00 to 20.00
Stove plate	15.00 to 16.00
Machine shop turnings	10.00 to 12.00
Cast iron borings	10.00 to 12.00

Buffalo

Pig Iron Dull—More Activity in Scrap—Pipe Active

BUFFALO, Sept. 11.—The pig iron market is very dull, with no great interest being shown by consumers. The inquiries are for small quantities, producers being rarely asked to figure on more than a couple of carloads at a time. The price has shown no weakening from the $25 base, but, on the contrary, seems to be a bit firmer. Total sales for the week have been under 5000 tons. Some success has been experienced by some makers in obtaining the 50c. differential for No. 2X iron.

We quote f.o.b. gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$25.50
No. 2 foundry, 2.25 to 2.75 sil.	25.00
No. 2 plain, 1.75 to 2.25 sil.	25.00
Basic	26.00
Malleable	25.00
Lake Superior charcoal	32.28

Finished Iron and Steel.—All classes of material are quiet. Prices stand up very well in the face of the dullness. The one material which continues very active and in which allocation of tonnage is being made steadily is pipe. Car-building activities in local shops show that business is keeping up well in this industry. The Buffalo Steel Car Co. recently purchased a tonnage of bars, shapes and plates, mostly the latter. The Buffalo Structural Steel Co. is low on 1000 tons of steel for the new Buffalo Consistory.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—Dealers have been active enough to furnish almost a lively market during the past week. Acting on the assumption that the mills must soon buy at dealers' prices, the latter have been buying steadily in preparation for that time. Three local mills are willing to buy heavy melting steel now, but they seek to buy it at about $17. Dealers want to get $18 to $19. There has been some activity in compressed sheets, also in turnings and borings. Some sheets have been bought at $15.50 to $16, and turnings and borings for use in blast furnaces have been sold. The price for the latter grade is $15 to $16.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel	$17.00 to $18.00
Low phos., 0.04 and under	23.50 to 24.50
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 bushelings	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 16.00
Railroad malleable	20.00 to 21.00

Cleveland

Pig Iron Buyers Begin to Show Interest in First Quarter Requirements

CLEVELAND, Sept. 11.—On Sept. 1 there was 5,907,272 gross tons of Lake Superior ore on Lake Erie docks, as compared with 4,956,705 tons on Aug. 1, and with 8,064,101 tons on Sept. 1, last year. Receipts at Lake Erie ports during August were 7,681,661 tons, as compared with 6,721,735 tons during August last year. Receipts at Lake Erie ports for the season up to Sept. 1 were 26,801,418 tons, as compared with 18,671,619 tons during the corresponding period a year ago. Shipments from the same docks up to Sept. 1 were 22,334,127 tons, as compared with 13,129,570 tons for the corresponding period of 1922.

Pig Iron.—Inquiry for foundry and malleable iron shows improvement and some consumers are beginning to take an interest in covering for their first quarter requirements, several inquiries having come out for that delivery. Quotations for the first quarter are being made on about the basis of ruling prices and it is expected that some of this business will be closed this week. Furnaces are uncertain regarding their costs and are not actively seeking first quarter contracts. Inquiries have come from foundries having casting contracts for that delivery, but are all outside the automobile field. The Westinghouse Electric & Mfg. Co., which recently purchased some early shipment iron, has sent out an inquiry for 3500 tons of foundry iron for Cleveland for the fourth quarter, and 3150 tons for Trafford City for deliveries extending through February. The price situation shows little, if any, change. While foundry and malleable iron are more commonly quoted at $25 by Valley and other Ohio district furnaces, this price is being shaded in some cases on desirable inquiries. We note the sale of 2000 tons of foundry iron to a radiator interest for the last quarter and another lot of 2000 tons for September shipment, both at $25, the latter iron to come from a Valley furnace. A Muncie, Ind., consumer is in the market for 2000 tons of malleable iron on which a quotation of $24.50 is understood to have been made. A sale of 500 tons of malleable iron was made to a Michigan consumer at $26. For Cleveland delivery furnaces continue to quote foundry and malleable iron at $25.50 at furnace. One interest that has been holding to $26 for Valley iron has reduced its quotation to $25.50. New inquiries include several for from 1000 to 2000 tons and one lake furnace now has inquiries pending aggregating 12,000 tons or more. The same producer booked 5000 tons during the week. Southern iron is inactive and not firm at $24 for Alabama iron. Consumers feel that the price is too high as compared with Northern iron.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$25.50 to 26.00
Southern fdy., sil. 1.75 to 2.25	29.50
Malleable	25.50 to 26.00
Ohio silvery, 8 per cent	37.52
Standard low phos., Valley furnace	30.00 to 32.00

Bolts, Nuts and Rivets.—New bolt and nut orders are light, but manufacturers report an increased volume of specifications on contracts. Leading manufacturers appear to be holding rather firmly to regular discounts and are not disturbed by some lower prices that are appearing. One manufacturer is quoting small machine bolts, rolled thread, at 60, 10 and 10 per cent, and larger and longer at 60 and 10 per cent off list and carriage bolts, rolled thread, at 60 and 10, and larger and longer at 60 per cent off list. The new price lists will have little effect before Oct. 1, as they do not apply to contracts that expire on that date. Some inquiry is coming out for fourth quarter contracts. Rivet specifications are good, but demand is light. The new rivet extras will become generally effective Oct. 1, as most consumers are under third quarter contracts. Small rivets are being shaded to 60, 10 and 5 per cent off list, but this discount is not general.

Alloy Steel.—Demand is light and and there is evidence that on an attractive inquiry regular quotations would be shaded.

Semi-Finished Steel.—Considerable additional business in sheet bars, slabs and billets has been booked by the leading local producer for the last quarter. About all this company's regular customers have been placed under cover, taking nearly all the mills' output of over 50,000 tons per month. Part of this business was taken at $42.50 and the remainder subject to trade paper prices.

Reinforcing Bars.—These are weak for both soft and rail steel as a result of keen competition for the small volume of business that is pending. Prices as low as 2.15c. are reported on rail steel bars, although the common range is 2.20c. to 2.30c. The only large inquiry pending is for 200 tons for the Western Reserve Hospital buildings of Cleveland.

Sheets.—Mills report an increase in orders from the automotive industry for blue annealed and automobile body sheets, but general buying is rather slow and a number of independent mills are anxious for business. Black sheets are still being shaded $2 to 3.75c., and some mills are offering their surplus stocks of all grades at less than the regular prices.

Finished Iron and Steel.—Orders and inquiries show a gain over last month, but this does not apply to all items. While the demand for steel bars has increased, the call for plates both in the heavier and light gages has fallen off materially. This is particularly noticeable by mills that cater to small lot business for early shipment. Generally consumers are buying rather small lots. Some demand is developing from the implement manufacturers for agricultural shapes for fall shipment and the demand for light rails from the coal mining companies has become fairly active. Prices are firm at the regular quotations on steel bars, plates and structural material. In the building field the outlook shows an improvement. Plans were sent out today for the 20-story bank and office building for the Brotherhood of Locomotive Engineers of Cleveland, which will require 56,000 tons of steel. Plans for the building of a county and municipal court and jail building of the office building type in Cleveland have reached a point where it is believed the project is assured. This will require 5000 tons of steel, but plans will not be out until after a vote on a bond issue in November. While excavating work has been started for the new union passenger station in Cleveland, an announcement has just been made that none of the steel will be purchased this year. This station will require 50,000 tons or more. An inquiry has come out for 500 underframes for gondola cars for the Elgin, Joliet & Eastern Railroad, requiring 700 tons of plates and structural material.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.50c. to 5.80c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Coke.—Quotations on standard Connellsville foundry coke are unchanged at $6.75 to $7.50 but because of the probable settlement of the anthracite coal strike a decline of 50c. a ton is looked for. A leading sanitary interest has closed for its foundry coke requirements for the last quarter at $7 for Wise County coke.

Warehouse Business.—The demand for steel out of warehouse shows some gain over last month. Prices are firm, except on sheets, on which considerable irregularity exists. Jobbers are making concessions to cut down large stocks on certain items.

Old Material.—The upward price movement appears to have been checked, as with few exceptions quotations were not changed during the week. There has been some buying by mills in small lots at ruling prices, but the advances have not caused any rush to buy on the part of consumers. Sales of turnings to a local mill were made during the week at $14 delivered. A Cleveland mill has purchased 1000 tons of turnings from a Detroit producer at $10.50 and 1000 tons at $11.50, Detroit, the freight rate being $3. In the Valley district dealers are reported to be paying $19.25 for heavy melting steel.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$17.75 to $18.00
Rails for rolling	20.00 to 20.50
Rails under 3-ft	19.50 to 20.00
Low phosphorus melting	20.50 to 21.00
Cast borings	13.50 to 14.00
Machine shop turnings	13.00 to 13.25
Mixed borings and short turnings	13.25 to 13.50
Compressed sheet steel	15.50 to 16.00
Railroad wrought	16.00 to 16.50
Railroad malleable	23.00 to 23.50
Light bundle sheet stampings	12.00 to 12.50
Steel axle turnings	16.00 to 16.75
No. 1 cast	21.00 to 22.00
No. 1 busheling	13.00 to 13.25
Drop forge flashings	13.25 to 13.75
Railroad grate bars	17.00 to 17.50
Stove plate	16.00 to 17.00
Pipes and flues	13.50 to 14.00

Detroit Scrap Trend Upward

DETROIT, Sept. 11.—The recent lettings by one of the largest producers in the district of approximately 2800 tons of miscellaneous scrap for September delivery developed a dealer's market with mills and furnaces showing little interest in the offering. Regular hydraulic compressed and short turnings seem to be most in demand and have registered an increase of several dollars per ton in the past two weeks. Automobile cast is also active, some small sales recording as high as $27 per short ton. All grades are showing strength and the market generally has an upward tendency.

The following prices are quoted on a gross ton basis, f.o.b. cars producers' yards, excepting stove plate, automobile cast and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$15.50 to $17.00
Shoveling steel	15.50 to 17.00
No. 1 machinery cast	19.00 to 20.00
Cast borings	11.50 to 13.00
Automobile cast scrap	25.00 to 27.00
Stove plate	16.00 to 17.00
Hydraulic compressed	13.00 to 14.00
Short turnings	12.50 to 13.00
Long turnings	10.00 to 11.00
Flashings	10.00 to 11.00

The Chicago Foundrymen's Club will hold its first fall meeting at the City Club, Chicago, Saturday evening, Sept. 15. H. P. Kreulen, pig iron and foundry department, Bethlehem Steel Co., will discuss Mayari pig iron and its use in the cupola with particular reference to the effect of its nickel and chromium content on gray iron and semi-steel castings. His remarks will be illustrated by stereopticon slides. Several reels of motion pictures will also be shown, presenting the mining and transportation of ores in both open pit and shaft mining, and the loading and handling of ore. George A. Richardson, publicity department, Bethlehem Steel Co., will explain the pictures.

Philadelphia

No Signs as Yet of Fall Buying Activity—Market Extremely Quiet

PHILADELPHIA, Sept. 11.—The steel trade had looked for fall buying activity to develop shortly after Labor Day, but the past week brought no change in the dullness which has prevailed for weeks. The mill situation is very satisfactory on some of the lighter products, particularly sheets and tin plate, but among the heavier products pipe is the only item which is strongly in demand. Plates, shapes and bars are not active and there is an almost complete absence of large inquiries and orders.

The pig iron market has not held the moderate degree of strength it showed early last week before the settlement of the anthracite coal strike was announced and foundry iron has settled to a basis of $25, furnace, for No. 2 plain. Scrap shows a good deal of strength considering the very light demand.

Pig Iron.—Early last week, most of the Eastern furnaces, in expectation of a long-continued strike in the anthracite coal fields, put up their quotations on foundry iron to a minimum of $25.50 for No. 2 plain and $26 for No. 2X. With the announcement of a settlement of the strike, the market lost most of this slight show of strength and prices now quoted by several eastern Pennsylvania interests are on the basis of $25, furnace, for No. 2 plain and $25.50 for No. 2X. Some furnaces that are not badly in need of tonnage adhere to quotations 50c. a ton higher and quite a little carload business has been done at the higher figures, but it is apparent that a purchaser of a fairly large tonnage would not be obliged to pay above $25, base. Nearly all furnaces are equalizing freight rates so that the net to sellers is sometimes slightly under $25. A Pennsylvania cast iron pipe company has bought about 7500 tons of foundry iron for delivery over the remainder of the year. This and a sale of 3000 tons of basic to a New England consumer are the largest transactions of the week. Other sales were mostly of small lots. A noteworthy development is the willingness of some consumers to cover for their fourth quarter requirements.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$25.76 to $26.63
East. Pa. No. 2X, 2.25 to 2.75 sil.	26.26 to 27.13
East. Pa. No. 1X	26.76 to 27.63
Virginia No. 2 plain, 1.75 to 2.25 sil.	30.67 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.	31.17 to 31.67
Basic delivered eastern Pa.	25.00
Gray forge	25.50 to 26.00
Malleable	26.26 to 26.84
Standard low phos. (f.o.b. furnace)	29.00 to 30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.80 to 2.50 sil.	$25.50
Continental foundry, 2.50 to 3.25 sil.	26.00
Low phos., copper free, guar. not over 0.035 per cent phos.	29.00
Continental, phos. 1.50; sil. 2 to 3	25.50

Ore.—Last week's receipts of foreign ore totaled 43,106 tons, of which 27,386 tons came from Sweden, 7300 tons from Greece and 8420 tons from Newfoundland.

Ferroalloys.—There has been no formal notice by British ferromanganese producers of a reduction in price, but resale ferromanganese, both foreign and domestic, is being freely offered at $112.50, seaboard, which is $5 a ton below the nominal price of British producers. Domestic furnaces are meeting the current quotations on resale material.

Semi-Finished Steel.—Eastern mills show no disposition to go lower than $42.50, Pittsburgh, for open-hearth rerolling billets and $47.50 for forging billets, but there has been no large inquiry to test these prices.

Plates.—Some of the Eastern plate mills are now running from hand to mouth, having specifications ahead for only a week or two. Prompt deliveries are being offered. In view of the lightness of the demand and the keen need of tonnage by some mills, even sellers express surprise at the strength in price, there having been no deviation, so far as reported, from 2.50c., Pittsburgh, by any mill.

Structural Material.—A large independent was offered a good-size tonnage of plain material a few days ago at 2.40c., Pittsburgh, but declined the business at less than 2.50c. An Eastern mill, which is freely quoting 2.40c., has brought about a situation where many consumers are demanding this price of their regular sources of supply, but so far as known all other mills are adhering strictly to 2.50c.

Bars.—One large interest is now offering steel bars for almost immediate shipment, but there is very little business in sight, orders being mostly of carload-lot size. There has been no indication of any price weakness. Demand for bar iron is also light, with prices unchanged.

Sheets.—An Eastern maker of blue annealed sheets has specifications in hand for six weeks' operation and the ordinary demands of regular customers will easily take up the production of the last two months. The sheet market is fairly strong, with prices holding firm. Less is heard of 3.75c. quotations on black sheets, which for a time were quite common.

Warehouse Business.—The demand for steel out of stock showed some falling off in the past week, but this week started out at a slightly better rate. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅜ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—The scrap market is in a peculiar position in that buyers do not want to buy and sellers do not wish to sell. Brokers are loath to take orders for more than a few carloads at a time at current prices for fear that the small dealers will stiffen their ideas on prices before they have had a chance to cover on their orders. The small dealers seem to believe that a fairly substantial advance in scrap prices is due, but there is nothing in the present attitude of the mills to give strength to such a view, and the mills will need considerable new finished steel tonnage on their books before there is an inclination to increase scrap purchases. A few grades are higher this week, but generally the market is about at the levels of a week ago.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$17.00 to $17.50
Scrap rails	16.50 to 17.00
Steel rails for rolling	19.00 to 19.50
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Cast-iron car wheels	21.00 to 22.00
No. 1 railroad wrought	19.00 to 20.00
No. 1 yard wrought	18.00 to 18.50
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	14.50 to 15.00
No. 1 busheling	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	14.50 to 15.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mills)	15.50 to 16.00
Cast borings (for chemical plants)	18.00 to 20.00
No. 1 cast	21.50 to 22.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	17.50 to 18.00
Stove plate (for steel plant use)	17.50 to 18.00
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 17.00
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

Canadian Scrap Market

TORONTO, Sept. 10.—The Canadian iron and steel scrap market is very quiet, and sales reported by dealers during the past week or ten days were at a very low ebb. The present stagnation in buying by consumers has been reflected in dealers almost entirely withdrawing from the market and for some time past the latter have been showing practically no interest in adding to their yard holdings. While Toronto dealers have made no change in their buying prices for the week, Montreal dealers report a softening tendency and reductions have been announced in some lines. Canadian scrap prices are as follows:

Dealers' Buying Prices—Gross Tons

	Toronto	Montreal
Steel turnings	$10.00	$9.00
Machine shop turnings	10.00	9.00
Wrought pipe	8.00	8.00
Rails	14.00	13.50
No. 1 wrought scrap	14.00	15.00
Heavy melting steel	14.00	13.00
Steel axles	*16.00	18.00
Axles, wrought iron	18.00	22.00
Net Tons		
Standard car wheels	15.00	16.00
Malleable scrap	15.00	16.00
Stove plate	15.00	16.00
No. 1 machinery cast	19.00	21.00

Proposed Increases of Short Haul Freight Rates

Increases in the short haul freight rates on iron and steel products, in the Pittsburgh district, which will become effective Oct. 7, unless the Interstate Commerce Commission heeds protests by affected interests, not only produce higher rates with the Pittsburgh area, but mean the elimination of the combination rates to Cleveland and Erie, which are somewhat lower than the through rate to those points from Pittsburgh. The present rate on iron and steel products from Pittsburgh to Youngstown and nearby points is 9½c. per 100 lb. while from the Youngstown district to Cleveland the rate also is 9½c., making a combination rate from Pittsburgh to Cleveland of 19c. The new rate to Youngstown from Pittsburgh is 11c., and from Youngstown to Cleveland also 11c., which would produce a combination rate of 22c., as only the new tariffs of the Baltimore & Ohio Railroad and the Pittsburgh & Lake Erie Railroad have been issued, but it is expected that the Pennsylvania tariff will be in line with those of those roads. Points outside of Pittsburgh, which formerly had a 9½c. rate go to 11c. in the new schedules.

Another interesting iron and steel freight rate development is the announcement that the reduced through tariffs to the Pacific Coast and intermediate points in the far western tier of States will become effective Oct. 10. The new through rate to Pacific Coast points from Pittsburgh will be $1.15 per 100 lb. against $1.50, the present through rate, and $1.34, the combination Pittsburgh-Chicago and Chicago-Pacific Coast rate.

Dismantling Lawrence Furnace

Lawrence furnace of the Marting Iron & Steel Co., Ironton, Ohio, located at Culbertson, Ohio, is being dismantled, having been sold for junk. The furnace, which had a capacity of 70,000 tons of pig iron per year, was built in 1889-90, and was first operated in March, 1891. It was rebuilt in 1905-06. The furnace had not been operating since 1920.

Figures of the National Automobile Chamber of Commerce place August production of cars and trucks at 348,733, an increase of 6.5 per cent over July's 327,102. For the eight months the total of 2,701,771 exceeds by 42,707 the largest previous entire year's production—that of 1922, with 2,659,064 vehicles.

The American Institute of Mining and Metallurgical Engineers will have an exhibit at the Chemical Exposition, which opens at the Grand Central Palace, New York, on Sept. 17.

Ashtabula Steel Co. Reorganized

The Ashtabula Steel Co., Ashtabula, Ohio, control of which recently passed to W. H. Davey and several brothers associated with the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, has been reorganized as the Ashtabula Steel Sheet Co. W. H. Davey, president of the Mansfield company, is president; Samuel Davey, vice-president; Evan M. Jones, second vice-president and manager, and A. I. Davey, secretary and treasurer. Control will pass to the new organization Sept. 15. Mr. Jones, the new manager, has been superintendent of the Parkersburg Iron & Steel Co., Parkersburg, W. Va. Members of the old organization who will retire include Robert Lock, president and manager, and W. J. Kunkle, treasurer. S. P. Ker, Jr., general sales manager of the old company, remains with the new organization, being one of the board of directors. The company plans the installation of the jobbing mills in addition to the six sheet mills which now comprise the plant.

"Puff" at Pulaski Furnace Kills Four

An unusual accident at the blast furnace of the Pulaski Iron Co. at Pulaski, Va., on the night of Sept. 2 caused the death of four workmen and injured several others. The furnace was operating under 7-lb. wind pressure, when suddenly this pressure jumped up to 15 lb., causing a "puff" in the stack which caused the lining to slip. The furnace was blowing out for repairs when the accident occurred. Repairs will be made immediately and the furnace will be in blast again in about 60 days.

Low Dust Content with Dry Cleaning of Blast Furnace Gas

At the blast furnaces of the Pittsburgh Steel Co., Monessen, Pa., experiments conducted by George B. Cramp have resulted in the development of a dry process for cleaning blast furnace gas, in which dusty gas from the furnace is caused to drop its usual dust burden into a hopper and the latter in turn fills a vertical grid with dust. The dusty gas must then go through this dust curtain in its passage through the apparatus and in so doing is filtered to a uniform cleanness of 0.083 grain of dust per cu. ft. of cleaned gas. Average wet washed gas at Monessen runs 0.12 grain per cu. ft. of cleaned gas and best previous results with dry cleaners have shown considerably higher dust content per cu. ft. than wet washed gas.

Wages of Sheet and Tin Mill Workers Advanced

YOUNGSTOWN, Sept. 11.—Tonnage rates of sheet and tin mill workers in Midwestern plants operating under the sliding wage scale of the Amalgamated Association of Iron, Steel and Tin Workers will be advanced 3 per cent for September-October as a result of the bimonthly examination of Sept. 11.

The average price of Nos. 26, 27 and 28 gage black sheets shipped during the 60-day period ending Aug. 31, was disclosed at 3.70c. per lb., as compared with 3.60c. two months before. Under the new rate, such workers will be paid 46⅓ per cent above base.

Tin mill employees, previously paid according to the selling price of tin plate, are now paid on the black sheet average selling price basis, the same as sheet mill workers.

The settlement was conducted between the Western Sheet and Tin Plate Manufacturers' Association and the Amalgamated Association.

The New England Iron League on Monday, Sept. 10, played golf at the Woodland Golf Club during the afternoon. In the evening the members gathered at the Boston Yacht Club, Atlantic Avenue, Boston, for dinner.

FABRICATED STEEL BUSINESS

About 10,500 Tons in Orders and 14,000 in Fresh Inquiries

The continued run of activity in fabricated steel work is shown in orders for upward of 10,000 tons and in fresh inquiries for some 14,000 tons. The awards include:

Apartment hotel for Allerton House Co. at Cleveland, 1500 tons, to Bethlehem Steel Co.

Western Electric Co., Kearney, N. J., power plant, 1600 tons, to American Bridge Co.

Rome Brass & Copper Co., Rome N. Y., plant addition, 250 tons, to American Bridge Co.

Iroquois Gas Co., Buffalo, N. Y., 900 tons, to Bethlehem Steel Co.

United States Metals Refining Co., Chrome, N. J., 350 tons, to Phoenix Bridge Co.

Matz office building, Los Angeles, 1000 tons, to Llewellyn Iron Works.

Euclid Avenue Bridge, Detroit, 500 tons, to Wisconsin Bridge & Iron Works.

United States Gypsum Co., buildings at Sweetwater, Tex., 218 tons, to Kansas City Structural Steel Co.

Compania Carbonifero De Sabinas, crane runway at Rosita, Mex., 160 tons, to Ingalls Iron Works.

Store building, West Allis, Wis., 100 tons, to Hackendahl & Schmidt, Milwaukee.

Masonic Temple, South Bend, Ind., 500 tons, to Forest City Steel & Iron Co.

Kosair Temple, Louisville, Ky., 450 tons, general contract to C. A. Koerner & Co.

Fiber Conduit Co., Richmond, Ind., factory, 300 tons, bids taken and unnamed Indianapolis fabricator low bidder.

Niagara Falls Hotel, Niagara Falls, N. Y., 700 tons, to Buffalo Structural Steel Co.

Nickel Plate Railroad, shop buildings at Conneaut, Ohio, 100 tons, to Fort Pitt Bridge Works.

County Home for Erie County, Buffalo, 900 tons, general contract awarded to Henry Shenk Co.

Masonic Temple, Fort Wayne, Ind., 700 tons, to Forest City Steel & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Grain elevator at Oswego, N. Y., 850 tons.

High school building at Clifton, N. J., 400 tons.

Ashley River bridge in North Carolina, 2200 tons; bids rejected.

Bridge over Raritan River at Perth Amboy, N. J., 6000 tons, bids closing today; previously reported.

Barge canal terminal at Oswego, N. Y., 1500 tons; bids closed Tuesday, Sept. 11.

Jersey City Evening Journal, publishing building, Jersey City, N. J., 1100 tons.

Sheridan Trust & Savings Bank Building, Chicago, 3500 tons.

Middle West Utilities Co., power house addition, Tulsa, Okla., 250 tons, bids being taken by Sargent & Lundy, Chicago.

Missouri Pacific, 100-ft. turntable, 115 tons.

Wabash Railway, 100-ft. turntable, 115 tons.

State of Indiana, highway bridge, about 800 tons, bids closed Sept. 10.

Brotherhood of Locomotive Engineers bank and office building, Cleveland, 5000 tons.

The Jay L. Harman Sales & Engineering Co., El Paso, Tex., has been organized to deal in industrial equipment and supplies for mines, smelters, railroads and manufacturing plants. Offices have been opened in the Mills Building, and a branch office will be established in Mexico City in charge of Juan F. Gonzales. Jay L. Harman, president of the company, was formerly manager of the Mine & Smelter Supply Co., at El Paso, and, previous to that connection, was with the Phelps-Dodge Corporation for several years.

RAILROAD EQUIPMENT BUYING

Orders Placed for 1000 Freight Cars and for Car Repairs

Orders for 1000 cars and a number of sizable car repair contracts were the contribution of the early days of September to the railroad equipment field. Among the items of chief interest are the following:

The Chesapeake & Ohio has ordered repairs to 500 coal cars, the work being divided between the Newport News Shipbuilding & Dry Dock Co. and the American Car & Foundry Co.

The Atchison, Topeka & Santa Fe Railroad has ordered 300 50-ton drop-end gondolas and 200 flat cars from the Pullman Co.

The Chesapeake & Ohio is asking for prices on 6 mail and express cars.

The Erie Railroad has placed an order with the Pressed Steel Car Co. for 45 suburban coaches.

The Elgin, Joliet & Eastern is inquiring for 500 underframes.

The Toledo, Peoria & Western is in the market for 275 box car repairs.

Mitsui & Co. are inquiring for 60 new box cars.

The Gulf Coast Lines are inquiring for 9 passenger cars.

The Mexican National Railways placed 5 coaches with the Pullman Co.

The Santa Fe ordered 300 mill-end gondola cars and 200 flat cars from the Pullman Co.

The Texas Co. is inquiring for 10 tank cars.

The Burlington placed car repairs with the Pullman Co. requiring 2000 tons of steel.

Trade Changes

The Standard Steel & Bearings, Inc., Philadelphia, has moved its Philadelphia plant to Plainville, Conn., occupying a spacious one-floor building.

The Pawling & Harnischfeger Co., Milwaukee, builder of traveling cranes, hoists and excavating machinery, has opened an office at 1124 Book Building, Detroit, with James Van Buskirk in charge.

The Logemann Brothers Co., Milwaukee, has purchased the business and assets of the Chicago Baling Press Mfg. Co., Chicago, and is continuing the manufacturing of the Logemann mechanical press for baling. The business is now entirely conducted from the main office and works of the Logemann Brothers Co.

The Wm. Inglis Wire & Iron Works, Detroit, manufacturer of steel wire factory partitions, window guards, machinery guards, etc., has moved into a new plant at 960 Harper Avenue, Detroit.

The Scranton office of the Dorr Co., engineers, New York, has been moved to 536 Miners Bank Building, Wilkes-Barre, Pa. John Griffen remains in charge.

Herbert W. Hayes, 40 Court Street, room 1003, Boston, formerly manager of sales for the Midvale-Cambria Co., has been appointed New England agent for the Surplus Steel Exchange, 7 Dey Street, New York.

J. W. Dickson, Commonwealth Building, Pittsburgh, who has been doing a brokerage business in pig iron, ferroalloys, coal and coke, and Geter C. Shidle, formerly with the Thomas R. Heyward Co., Pittsburgh, have become associated under the firm name of J. W. Dickson & Co. The firm plans to do a warehouse business, as well as to act as agents of producers. Mr. Shidle, for several years before the formation of the Wheeling Steel Corporation, was Pittsburgh district sales agent of the LaBelle Iron Works, and before that was identified with E. W. Midge & Co. He is secretary of the Cutler Steel Co., Pittsburgh, plant of which is at New Cumberland, W. Va.

The David Joseph Co., waste material dealer, has opened a downtown office at Youngstown, Ohio, in suite 608-9-10, Wick Building. Phil Frieder will continue in charge of the office. The company has also opened a New York office in the Cortlandt Building, 30 Church Street, with W. J. Doherty as Eastern representative.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Material

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base .....2.40c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base, per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb.....3.15c.
Bands, base, per lb.....3.15c.
Strips, base, per lb.....3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb.....$1.62

Cold-Finished Steels

Bars and shafting base, per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4.50c. to 4.75c.
Bars, S. A. E. Series, No. 2300.....6.50c. to 6.75c.
Bars, S. A. E. Series, No. 3100.....5.50c. to 5.75c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb..... 2.75
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Galvanized wire, No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100 lb..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg..... 2.70
Woven fence, carloads (to jobbers)....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 to 60, 10 and 5 per cent off list
Machine bolts, small, cut threads,
60 and 10 to 60 and 5 per cent off list
Machine bolts, larger and longer,
60 and 10 to 60 and 5 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads,
60 and 10 to 60 and 5 per cent off list
Cut threads.....60 to 50, 10 and 5 per cent off list
Larger and longer.....60 to 50, 10 and 5 per cent off list
Lag bolts .....65 and 10 to 65 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 5 per cent off list
Larger and longer sizes.....50 and 5 per cent off list
Hot pressed square or hex. nuts, blank.....4.00c. off list
Hot pressed nuts, tapped.....4.00c. off list
C.p.c. and t. square or hex. nuts, blank.....3.75c. off list
C.p.c. and t. square or hex. nuts, tapped.....3.75c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 per cent off list
⅞ in. and larger, U. S. S.....75 per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
55 and 5 to 50 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
70 and 10 to 65 and 5 per cent off list
Washers .....5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb..$3.00 to $3.10
Small rivets .....65, 10 and 5 to 65 and 5 off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb.....	$3.15
Spikes, ½ in., ⅞ in. and ⅝ in., per 100 lb.....$3.15 to	3.50
Spikes, ⅞ in..... 3.15 to	3.50
Spikes, boat and barge, base, per 100 lb.....	3.50
Track bolts, ¾ in. and larger, base, per 100 lb..$4.00 to	4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 5.00 to	5.50
Tie plates, per 100 lb..... 2.55 to	2.60
Angle bars, base, per 100 lb.....	2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ to ⅜ ....+11		+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3.....	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12 ...	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜ .....+19		+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½.....	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10.....	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.....	27	1¼ in. .....+18	
2½ to 2¾ in.....	37	1¾ to 1⅞ in.....+	8
3 in.	40	2 to 2¼ in.....—	2
3¼ to 3¾ in.....	42½	2½ to 3 in.....—	7
4 to 13 in:.....	46	3¼ to 4½ in.....—	9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.....	36
1¼ and 1½ in.....	47	3½ and 3¾ in.....	37
1¾ in.	31	4 in.	41
2 and 2¼ in.....	22	4½ in. and 5 in.....	33
2½ and 2¾ in.....	32		
Hot Rolled			
3 and 3¼ in.....	38	4 in.	43
3½ in. and 3¾ in....	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base .....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list

Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage....	15	2¼-in. O.D. 10 gage..	20
2-in. O.D. 11 gage....	16	3-in. O.D. 7 gage....	35
2-in. O.D. 10 gage....	17	1½-in. O.D. 9 gage..	15
2¼-in. O.D. 12 gage..	17	5⅝-in. O.D. 9 gage..	55
2¼ in. O.D. 11 gage..	18	5½-in. O.D. 9 gage..	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base $11.00		20-lb. coating I. C....$14.90	
8-lb. coating I. C....	11.30	25-lb. coating I. C....	16.20
12-lb. coating I. C....	12.70	30-lb. coating I. C....	17.35
15-lb. coating I. C....	13.95	35-lb. coating I. C....	18.35
		40-lb. coating I. C....	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic.	$0.32	Buffalo	$0.265	St. Louis.....	$0.43
Philadelphia, export...	0.235	Cleveland	0.215	Kansas City.....	0.735
Baltimore, domestic...	0.31	Cleveland, Youngstown		Kansas City (pipe)...	0.765
Baltimore, export	0.225	Comb.	0.19	St. Paul	0.60
New York, domestic...	0.34	Detroit	0.29	Omaha	0.735
New York, export.....	0.255	Cincinnati	0.29	Omaha (pipe)	0.705
Boston, domestic.....	0.365	Indianapolis	0.31	Denver	1.27
Boston, export.....	0.255	Chicago	0.34	Denver (pipe)	1.215

Pacific Coast $1.34	
Pac. Coast, ship plates	1.20
Birmingham	0.58
Memphis	0.56
Jacksonville, all rail..	0.70
Jacksonville, rail and water	0.415
New Orleans	0.67

The minimum carload to most of the foregoing points is 6000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cable and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11½c.
Iron ore, Swedish, average 66 per cent iron	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	43c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	41c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$112.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	112.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace	45.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton	44.00
Ferrosilicon, 50 per cent, delivered, per gross ton	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	59.10
Silvery iron, 6 per cent, per ton, furnace	32.00
Silvery iron, 7 per cent, per ton, furnace	33.00
Silvery iron, 8 per cent, per ton, furnace	34.50
Silvery iron, 9 per cent, per ton, furnace	36.50
Silvery iron, 10 per cent, per ton, furnace	38.50
Silvery iron, 11 per cent, per ton, furnace	41.80
Silvery iron, 12 per cent, per ton, furnace	45.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	23.50

Per 1000 f.o.b. works:

	High Duty	Moderate Duty
Fire Clay:		
Pennsylvania	$46.00 to $48.00	$40.00 to $45.00
Maryland	50.00	45.00
Ohio	45.00 to 46.00	40.00 to 42.00
Kentucky	45.00 to 46.00	40.00 to 42.00
Illinois	48.00	45.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton		6.50 to 9.50
Silica Brick:		
Pennsylvania	42.00 to 45.00	
Chicago		52.00
Birmingham		53.00
Ground silica clay, per net ton		10.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$42.50
Rolling billets, 2-in. and under	42.50
Forging billets, ordinary carbons	47.50
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	$42.50
Wire rods, common soft, base, No. 5 to ¼-in.	51.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb.	2.40
Skelp, sheared, per lb.	2.40
Skelp, universal, per lb.	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled base, per lb.	1.90c. to 2.00c.
Spikes, ⅜-in. and larger, base, per 100 lb.	$3.15
Spikes, ½-in., ⅝-in. and ¾-in., base per 100 lb.	$3.15 to 3.50
Spikes, ⅜-in., base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.15 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.75 to 5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.50c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.15 to $3.25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80
5/16-in.	5.50	6.00
⅜-in.	6.50	7.00
7/16-in.	9.00	9.50
½-in.	11.00	11.50
9/16-in.	15.00	15.00
⅝-in.	19.50	20.00
¾-in.	28.50	28.50
⅞-in.	37.00	37.50
1 in.	58.50	60.50
1⅛-in.	88.00	97.00
1¼-in.	132.00	132.00
1⅜-in.	176.00	176.00
1½-in.	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(½% Nickel, 10 to 20 per cent Carbon)	$3.25 to $3.50
2300 (3½% Nickel)	5.25 to 5.50
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.25 to 4.50
3200 (Nickel Chromium)	6.00 to 6.25
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75 to 4.00
5200*(Chromium Steel)	8.00 to 8.25
6100 (Chromium Vanadium bars)	5.00 to 5.25
6100 (Chromium Vanadium spring steel)	4.75 to 5.00
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.25 to 5.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

British Iron and Steel Market

Pig Iron Drops Another 2½s.—Sheets and Tin Plate Firm—Continental Markets Improving

(By Cable)

LONDON, ENGLAND, Sept. 11.

Pig iron, both foundry and forge, is weak, and demand is poor. Hematite is steady.

One additional furnace has been blown out. Of the total of 39 Cleveland furnaces now blowing, 10 are on foundry iron, 12 hematite and 17 basic and specials.

Foreign ore is stagnant on further curtailment of the pig iron output. Bilbao Rubio is nominally 22½s. to 22¾s. ($5.13 to $5.18) ex-ship Tees.

Finished steel is unchanged. The works generally are wanting orders on heavy specifications. Australia has placed 8000 tons of plates and sections. Germany is inquiring for fair lines. The Indian Government is inquiring for large tonnages of railroad stores.

Continental markets are firm on a well-sold condition. On the Belgian order books, November-December is generally the earliest shipment available for most material. Japan has bought fair lines of bars and angles, but there is no large demand from that quarter.

In France 107 furnaces were in blast Aug. 1. In Germany the French have occupied part of the plant of the Phoenix Aktien Gesellschaft at Hoerde, Westphalia.

Tin plate shows a firmer tendency on the recent rise in tin and merchant orders against specifications. The stabilization committee meeting today is to discuss the future of the scheme and prices. Indications are that no alteration is probable.

Galvanized sheets are firm on some demand from the Far East, but the works are not keen sellers at the moment, when the Indian demand is expected to materialize, and it is realized that Japanese requirements in the future necessarily will be heavy.

Black sheets to Japanese specifications are nominal, with few works selling.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.56 per £1, as follows:

Durham coke, delivered	£2	1s.		to £2	1½s.	$9.35	to	$9.46
Bilbao Rubio ore†	1	4				5.47		
Cleveland No. 1 foundry	5	2½				23.37		
Cleveland No. 3 foundry	4	17½				22.23		
Cleveland No. 4 foundry	4	12½				21.09		
Cleveland No. 4 forge	4	10				20.52		
Cleveland basic	5	0				22.80		
East Coast mixed	4	18½	to	5	0	22.39	to	22.80
Ferromanganese	18	0				82.08		
Ferromanganese*	18	10				84.36		
Rails, 60 lb. and up	8	0	to	9	0	36.48	to	41.04
Billets	7	10	to	8	5	34.20	to	37.62
Sheet and tin plate bars, Welsh	9	2½				41.61		
Tin plates, base box	1	3¼	to	1	3¼	5.27	to	5.30
						C. per Lb.		
Ship plates	9	5	to	9	15	1.88	to	1.98
Boiler plates	12	10	to	13	0	2.54	to	2.64
Tees	9	15	to	10	5	1.98	to	2.08
Channels	9	0	to	9	10	1.83	to	1.93
Beams	8	15	to	9	5	1.78	to	1.88
Round bars, ⅝ to 3 in.	10	15	to	11	5	2.19	to	2.39
Galvanized sheets, 24 g.	18	10	to	18	15	3.76	to	3.82
Black sheets, 24 gage	13	15				2.80		
Black sheets, Japanese specifications	15	5				3.10		
Steel hoops	12	0	&	12	10*	2.44	&	2.54*
Cold rolled steel strip, 20 gage	17	5				3.51		
Cotton ties, Indian specifications	15	0				3.05		

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

Foundry pig iron:								
Belgium	£5	5s.				$23.94		
France	5	5				23.94		
Luxemburg	5	5				23.94		
Billets:								
Belgium	7	0				31.92		
France	7	0				31.92		
Merchant bars:						C. per Lb.		
Belgium	8	0	to	£8	5s.	1.63	to	1.68
Luxemburg	7	17½	to	8	5	1.60	to	1.68
France	7	10				1.53		
Joists (beams):								
Belgium	7	12½				1.55		
Luxemburg	7	12½				1.55		
France	7	10	to	7	12½	1.53	to	1.55
Angles:								
Belgium	8	0	to	8	5	1.63	to	1.68
⅛-in. plates:								
Belgium	8	15	to	9	0	1.78	to	1.83
Germany	8	10				1.73		
¾-in. plates:								
Luxemburg	7	15				1.58		
Belgium	7	10				1.53		

Machinery Trade of Japan

Great Britain and the United States are the only countries which have participated extensively in supplying Japan with machinery. In some particulars, Great Britain has had almost a monopoly of the field, while in others the United States occupies a similar position, according to figures prepared by the industrial machinery division of the United States Department of Commerce. In 1913, Great Britain furnished 48.4 per cent of the total machinery imports into Japan, compared with only 8.7 per cent from the United States. In 1920, however, the British percentage had dropped to 20.6, while the United States, with 51.4 per cent, had more than half of the total, and about 2½ times as much as the British share. In the meantime the proportion furnished by the rest of the world fell from 42.9 per cent in 1913 (five times the United States' share) to 28 per cent in 1920 (little more than one-half what the United States furnished.)

In 1921 Great Britain led in steam engines and boilers, water wheels, cranes, paper-making machinery, spinning and weaving machinery, which were the largest items of all, tissue-finishing machinery, and fuel economizers. In that same year, the United States led in steam turbines, internal combustion engines, pumping machinery, metal and wood-working machinery, knitting machinery, capstans, gas compressors, blowing machines, hydraulic presses, pneumatic tools, and in the general group of "all other."

Of the various types of machines listed, aggregating $82,762,000, the United States furnished $39,666,000, and Great Britain furnished $34,287,000, leaving $8,809,000 for all other countries of origin. The largest items are shown in the table.

Machinery Trade of Japan

(Thousands of Dollars)

	Furnished in 1921 by United States	Great Britain	1921 Total	1922 Total
Spinning machinery	$10,479	$15,857	$29,180	$30,596
Metal and woodworking machinery	7,211	3,375	10,976	6,521
Steam boilers	2,226	5,117	7,605	6,403
Weaving machinery	151	1,676	2,973	1,333
Steam turbines	1,870	....	2,292	1,052
Tissue-finishing machinery	449	1,042	2,122	1,467
Pumping machinery	1,135	574	1,991	1,391
Water turbines and wheels	102	374	1,600	2,979
Fuel economizers	165	1,294	1,510	932
Gas compressors	1,198	60	1,335	1,769
Internal combustion engines	747	199	1,111	2,371
Cranes	340	595	1,034	771
Totals*	$39,666	$34,287	$82,762	$75,756

*Include many items not listed.

Germany's exports of iron and steel in May were 135,605 metric tons, according to *Stahl und Eisen*. This brings the total to June 1, this year, to 869,231 tons as compared with 1,021,112 tons for the same four months in 1922. Imports of iron and steel in May were 134,947 tons or 785,613 tons to June 1. They were 695,776 tons to June 1, 1922. Scrap imports were only 4149 tons in May or 129,993 tons to June 1 compared with 163,532 tons to June 1, 1922.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Sept.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
5.....	14.00	13.50	41.37½	7.00	6.70	6.87½	6.52½
6.....	14.00	13.50	41.87½	7.00	6.70	6.90	6.55
7.....	14.00	13.50	42.12½	7.00	6.70	6.87½	6.52½
8.....	14.00	13.50	....	7.00	6.70	6.87½	6.52½
10.....	14.00	13.50	42.12½	7.00	6.72½	6.87½	6.52½
11.....	14.12½	13.62½	42.12½	7.00	6.72½	6.90	6.55

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Sept. 11.

The tone of all the markets is considerably improved and the prospects of a better feeling in the Ruhr situation has helped matters here. The copper market, while firm, is quiet and slightly higher. Fairly heavy sales have been made in the tin market at advancing prices. Consumptive demand for lead is good at unchanged prices. The zinc market is quiet and very steady.

Copper.—An unusually good business is reported for August, total sales aggregating close to 200,000,000 lb., or one of the best months in the year. Sales for export are put as equal to or better than any month this year. Most of the business, particularly in the last week or two, was done at 13.50c. to 13.75c., delivered. Thus far this month demand has been light, and while a little copper is available at 13.75c., delivered, most producers are now asking 13.87½c. to 14c., delivered, with some refusing to sell at less than 14c. The prospects of a settlement of the Ruhr problem is a bullish factor and the general opinion is that the market has for some time experienced its lowest prices. Thus far Japan has not been active enough to be a factor in bidding for the metal. Because of the heavy sales last month and the favorable statistical position of the industry as a whole, the market is regarded as strong and steady. Lake copper is quoted at 14c. to 14.25c., delivered.

Tin.—At least 1500 tons of Straits tin has been sold since Sept. 4, and the market has been quite lively on certain days. There was an active market on Sept. 5 when 500 tons changed hands. Early on that day dealers were sellers at 41.25c., but by mid-afternoon they became buyers at 41.25c. to 41.37½c., and very late in the day one parcel changed hands at 41.62½c. On the next day, Sept. 6, from 200 to 300 tons of tin, ex-steamer afloat, for September-October delivery, changed hands at 41.75c. to 41.95c. Fair sales were recorded on Friday up to 200 tons with about 100 tons sold on Saturday. Yesterday, Sept. 10, large sales were recorded with every offering from London taken, indicating liquidation of tin on long account. The sales are reported to have been between 500 to 700 tons. Consumers were active buyers with the bulk of demand for nearby position. Sentiment has been better each day, due partly to the improved Ruhr situation. Quotations for spot Straits tin was 42.12½c. New York today, with the market moderately dull. London prices today were £198 10s. for spot standard, £199 17s. 6d. for future standard and £202 5s. for spot Straits, all about £1 per ton higher than a week ago. Arrivals thus far this month have been 1155 tons, with 6280 tons reported afloat.

Lead.—The market is strong with buying for consumption very good. Sales have been made in round lots in the outside market up to 7c., New York, with the price of the leading interest unchanged at 6.75c., New York, at which it is booking limited amounts. The market is quotable at 6.70c. to 6.75c., St. Louis, or 7c., New York.

Zinc.—While domestic and foreign buying is largely at a standstill, the high price of ore and the disinclination of producers to force the market have caused a firm and steady tone, with prices changed but little in the past week. The prospect of a clearing up of the European situation is having some effect and a waiting attitude in this market is a feature. Prime Western for early delivery is quoted at 6.55c., St. Louis, or 6.90c., New York, with future delivery at a premium of five to ten points per month.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside spot market quotations for both shot and ingot nickel are 29c. to 32c.

Antimony.—Chinese metal in wholesale lots for early delivery is quoted at 7.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 26.50c., New York, duty paid, in such cases where they can obtain it from foreign producers. The leading domestic producer makes public no quotations.

Old Metals.—The market is firm and business more active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.50
Copper, light and bottoms	10.75
Heavy machine composition	10.75
Brass, heavy	7.75
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.25
Lead, heavy	6.25
Lead, tea	5.25
Zinc	5.00
Cast aluminum	16.75
Sheet aluminum	16.75

Chicago

SEPT. 11.—The metals are generally stronger and tin and lead have advanced, but no real buying movement has yet developed. Among the old metals, grades of lead, tin, and zinc have advanced. We quote in carload lots, Lake copper, 14.50c.; tin, 43c.; lead, 6.80c.; spelter, 6.55c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.25c.; copper bottoms, 9.50c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 5.25c.; zinc, 4.25c.; pewter, No. 1, 21c.; tin foil, 26c.; block tin, 32c.; all buying prices for less than carload lots.

Steel Corporation's Orders Decrease

Unfilled business on the books of the United States Steel Corporation as of Aug. 31 amounted to 5,414,663 tons, or 496,100 tons less than reported for July 31. During July unfilled orders decreased 475,498 tons, in June 595,090 tons, in May 307,158 tons and in April 114,823 tons, while increases of 119,343 tons, 373,213 tons and 165,073 tons were shown respectively in March, February and January. A year ago the unfilled tonnage was 5,950,105 tons, or 535,442 tons more than on Aug. 31, last year. Following is the unfilled tonnage as reported by months since January, 1920:

	1923	1922	1921	1920
Jan. 31.....	6,910,776	4,241,678	7,573,164	9,285,441
Feb. 28.....	7,283,989	4,141,069	6,933,867	9,502,081
March 31.....	7,405,332	4,494,148	6,284,765	9,892,075
April 30.....	7,288,509	5,096,913	5,845,224	10,359,747
May 31.....	6,981,351	5,254,228	5,482,487	10,940,465
June 30.....	6,386,261	5,635,531	5,117,868	10,978,817
July 31.....	5,910,763	5,776,161	4,830,324	11,118,468
Aug. 31.....	5,414,663	5,950,105	4,531,926	10,805,038
Sept. 30.....	.....	6,691,607	4,560,670	10,374,804
Oct. 31.....	.....	6,902,287	4,286,829	9,836,852
Nov. 30.....	.....	6,840,242	4,250,542	9,021,481
Dec. 31.....	.....	6,745,703	4,268,414	8,148,122

The largest total of unfilled orders was on April 30, 1917, at 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Power Developed by Horses

At the Iowa State Fair early in September tests were made on the tractive pull and horsepower developed by teams of farm and city horses. A new form of dynamometer made possible exact determinations of both of these quantities and will, it is believed, make it easy hereafter to grade work horses definitely by performance. The highest power developed was 21.2 horsepower for a team weighing 3630 lb. The maximum pull recorded by this team, or by any other team, was 2300 lb., this maximum being maintained for 25 ft.

PERSONAL

Announcement of the appointment of B. T. Bechtel as Chicago district sales manager, F. A. Lathrop as assistant district sales manager at Chicago, and Glenn W. Christopher as Pittsburgh district sales agent of the Youngstown Sheet & Tube Co. was made in THE IRON AGE of Sept. 6. Mr. Bechtel has been identified with the Steel & Tube Co. of America and its predecessor, the Mark Mfg. Co., since the inception of the latter 21 years ago. From 1901 to 1904 he was a sales repre-

F. A. LATHROP

G. W. CHRISTOPHER

sentative in the Western States and when the Zanesville, Ohio, plant was purchased in 1904, he was transferred to the Eastern States. In 1906 he was appointed district sales manager at Pittsburgh, remaining there until 1917, when he was transferred to Chicago as assistant manager of sales. From 1922 to the time of the absorption of the Steel & Tube Co. by the Youngstown company, he was general manager of sales. Mr. Bechtel is a native of York, Neb. Mr. Lathrop has been identified with the sales department of the Youngstown company at Chicago for 17 years, having been district sales agent since 1915. Prior to going with the Youngstown company he was for two years with the Mark Mfg. Co. at Chicago, and before that time for five years with the Western Tube Co. at Kewanee, Ill. Before going to Kewanee he was for ten years identified with the National Tube Works Co. at Chicago. Mr. Christopher has been in the sales service of the Youngstown company for 11 years. During the past five years he has been sales representative working out of Chicago and, prior to that, he was for two years at St. Louis, one year at Atlanta, and during the remainder of the period at Youngstown. He was born at Wessington, S. D., Oct. 13, 1886.

S. G. Eastman, district sales manager Niles-Bement-Pond Co. at San Francisco, has been transferred to Chicago in the same capacity to succeed George F. Mills, who has retired, after 35 years as Chicago sales manager. Mr. Eastman was located in San Francisco for eight years, prior to which time he was for eight years at Chicago as district sales manager for the Pratt & Whitney Co. His affiliation with the Pratt & Whitney Co. and the Niles-Bement-Pond Co. covers 21 years. Prior to going to Chicago the first time he was located in New York for about a year and a half, and for three years, between 1904 and 1907, was situated at Birmingham, having opened the Birmingham office of the organization.

A. B. Neumann, consulting engineer, Chicago, has been elected a member of the board of directors of the Consolidated Steel & Iron Corporation, Terre Haute, Ind.

Russell R. Shepherd, who has been identified with the Steel & Tube Co. of America, Chicago, since 1916, formerly as electrical superintendent and more recently an electrical supervisor, has severed his connection since the merger with the Youngstown Sheet & Tube Co. His future plans have not been announced.

Nelson Littell, assistant examiner in charge of metal founding in the United States Patent Office since August, 1919, has resigned to engage in practice of patent law.

Wilson K. Ray of Pittsburgh, formerly connected with the Industrial Machinery Division, Department of Commerce, has been appointed Assistant Trade Commissioner and will be assigned to France, with headquarters at the American Embassy.

Francis Wagner, Martin Building, El Paso, Tex., has been appointed sales agent in the Southwest for the Trumbull Steel Co., Warren, Ohio. His territory will also include northern Mexico.

William J. Priestley, formerly steel works superintendent naval ordnance plant, Charleston, W. Va., and later works manager Pittsburgh Crucible Steel Co., Midland, Pa., is now metallurgical engineer with the Electro-Metallurgical Sales Corporation, New York, with offices at 817 Oliver Building, Pittsburgh. Mr. Priestley is to act in a consulting metallurgical capacity for the benefit of customers of the company.

Heber G. Stout, export manager Chain Belt Co., Milwaukee, who arrived in Japan on Aug. 26 to place in operation new distribution centers, has not been located since the earthquake. He was to have sailed for America on Sept. 6.

Oliver A. Lanchantin has resigned as manager of the Pittsburgh office, Oliver Brothers, Inc., New York, effective Oct. 1, to become general manager of sales, Eastern Steel Products Corporation, maker of cold-finished steel bars with a plant at Spring City, Pa., and executive office in the Widener Building, Philadelphia. Mr. Lanchantin was born in Brooklyn and attended the University of Pittsburgh and Duquesne University, Pittsburgh. He entered the employ of the Pacific Hardware & Steel Co., San Francisco, in its New York offices as assistant buyer in 1910. Three years later he resigned to join the Oliver Brothers, Inc., with which he since has been affiliated except for the period of American participation in the World War, when he was in the Quartermasters' Department. From 1915 to 1918 he was in the Pittsburgh office of the company. After his discharge from the army he rejoined the company as manager of its New York office and also manager of its export department. Since 1921 he has been manager of the company's Pittsburgh office, in which capacity he had charge of purchases of all iron and steel and heavy hardware items for the company.

Henry D. Hibbard, Plainfield, N. J., will return next week from a professional trip to Great Britain.

A. A. Corey has been elected president of the Vanadium Corporation of America to succeed J. Leonard Replogle. Mr. Corey, W. E. Corey, Payne Whitney, Samuel Pryor and F. W. Allen were elected directors, succeeding Joseph De Wyckoff, Charles M. Walton, Jr., E. R. Tinker and E. F. Nickerson, resigned, and the late Charles McNeil. L. F. Diffenderfer, treasurer of the company, was elected secretary-treasurer, succeeding Mr. Nickerson, who resigned as secretary.

Charles L. Close, head of the Steel Corporation's bureau of safety, sanitation and welfare, has made a good recovery after a major operation in a New York hospital.

John A. Topping, chairman Republic Iron & Steel Co., is spending a few weeks in Canada.

George B. Mitchell, for many years identified with the Jones & Laughlin Steel Corporation, Pittsburgh, latterly as assistant manager of sales, cold-rolled department, has joined the Union Drawn Steel Co., Beaver Falls, Pa., as general manager of sales. He succeeds the late Frederick N. Beegle, who besides his other duties had supervised sales.

Baron Kjell Akerhielm is in the United States as the representative of Jernkontoret, the Swedish iron masters' association, to investigate the various me-

chanical puddling processes. His address is in care of Einar Brundin, Dannemora Steels, Inc., 249 Pearl Street, New York.

George Morrisey, formerly general superintendent St. Louis Coke & Iron Co., St. Louis, at Granite City, has been made consulting engineer. M. D. Curran has been promoted from assistant superintendent to general superintendent to succeed Mr. Morrisey, and J. D. Shaw of the St. Louis sales office becomes district manager at Davenport, Iowa.

Thomas F. Kelly, Buffalo, N. Y., has been appointed manager of the Smelters' General Briquette Corporation, specializing in the manufacture of briquettes for smelting purposes, notably from iron flue dust. The new corporation has been organized to succeed the metallurgical department of the General Briquetting Co. Ellsworth B. A. Zwoyer, Perth Amboy, N. J., has been appointed manager of the General Fuel Briquette Corporation organized to succeed the fuel department of the General Briquetting Co.

F. B. Foley, metallurgist of the Department of the Interior, attached to the Mississippi Valley experiment station of the Bureau of Mines, is making a study of the special adaptability of the steels being used in the manufacture of oil well drilling equipment.

OBITUARY

Donald D. Herr a Victim of the Earthquake in Japan

DONALD D. HERR, vice-president Arthur G. McKee & Co., Cleveland, was killed in a landslide that accompanied the earthquake in Japan. His death occurred at Miyanoshita, a Japanese summer resort, where the first severe quake caused a part of the mountain to slide into a gorge, carrying with it a Japanese shop in which Mr. Herr was buying curios to send to Cleveland friends. With him at the time was Joseph S. Ruble, vice-president W. S. Ferguson Co., a college classmate who recently went to Japan to supervise some steel plant construction work for his company. Mr. Ruble was pinned to the ground by a telephone pole that was dislodged by the slide, but was only slightly injured. Mr. Herr was about 45 years of age and had been connected with Arthur G. McKee & Co. since his graduation from the Pennsylvania State College, 22 years ago. His first employment was as a consulting engineer, and in 1911, when the firm was reorganized, he was made vice-president. Several weeks ago he started on a trip to the Orient, largely for pleasure, and had planned before his return to inspect the blast furnaces erected by Arthur G. McKee & Co. at Asansol, near Calcutta, India. Mr. Herr was unmarried. He was a member of the Union and Mayfield Country Clubs of Cleveland. His pleasing personality had won him a host of friends in the steel industry.

DONALD D. HERR

E. CLAYTON GOODWIN, vice-president Fafnir Bearing Co., New Britain, Conn., died at the New Britain General Hospital on Sept. 5, aged 57, following an operation. Mr. Goodwin had been in poor health for about a year. He was a native of Terryville, Conn.

WILLIAM STEVENS, president and treasurer of the Stevens Iron Works Co., Cleveland, died suddenly, Sept. 9, age 57 years.

Gilbert H. Johnson Guest of Honor

Gilbert H. Johnson, treasurer Isaac G. Johnson & Co., Spuyten Duyvil, New York, at the time that company passed out of existence June 30 last, as the result of the condemnation of its plant site for the widening of Harlem River, and who retired as president of the Steel Founders' Society of America on July 1 last, was the guest of honor at a reception and dinner given by the Steel Founders' Society on Friday, Sept. 7, at the Westchester Biltmore Country Club, Rye, N. Y. A handsome testimonial was presented Mr. Johnson and a number of addresses were made expressing appreciation of his untiring energy and devotion in the interests of the society during his presidency from Jan. 1, 1911, to July 1, 1923. J. P. Allen, Union Steel Casting Co., Pittsburgh, was toastmaster, and the presentation of the testimonial to Mr. Johnson was by Arthur H. Jameson, Bayonne Steel Casting Co., Bayonne, N. J. The cover of the program contained a reproduction of the picture of the old Johnson plant at Spuyten Duyvil, New York, which appeared in THE IRON AGE, June 21 last, in connection with the story of the passing of Isaac G. Johnson & Co.

COMING MEETINGS

September

Chemical Industries. Sept. 17 to 22. National exposition, Grand Central Palace, New York.

Machine Tool Exhibition. Sept. 18 to 21. Mason Laboratory, Yale University, New Haven. New Haven Branch, American Society of Mechanical Engineers, 400 Temple Street, New Haven, Conn., in charge.

Association of Iron and Steel Electrical Engineers. Sept. 24 to 28. Convention and exhibition, Broadway Auditorium, Buffalo. J. F. Kelly, 1007 Empire Building, Pittsburgh, secretary.

American Electrochemical Society. Sept. 27 to 29. Annual meeting, Dayton, Ohio. Dr. Colin G. Fink, Columbia University, New York, secretary.

October

National Safety Council. Oct. 1 to 5. Twelfth annual meeting, New Statler Hotel, Buffalo. W. H. Cameron, 168 North Michigan Avenue, secretary.

American Society for Steel Treating. Oct. 8 to 12. Annual convention, Motor Square Garden, Pittsburgh. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

West Virginia and Kentucky Association of Mining Mechanical and Electrical Engineers. Oct. 19 and 20. Third annual convention, Hotel Frederick, Huntington, W. Va.

American Society of Mechanical Engineers. Oct. 23 and 24. Regional meeting, Chattanooga, Tenn. E. C. Patterson, general manager Chattanooga Boiler & Tank Co., Chattanooga, in charge of details.

National Association of Farm Equipment Manufacturers. Oct. 24, 25 and 26. Thirteenth annual convention, Statler Hotel, Cleveland. J. B. Bartholomew, Peoria, Ill., president.

American Welding Society. Oct. 24, 25 and 26. Fall meeting, Pittsburgh. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Gear Manufacturers Association. Oct. 25, 26 and 27. Fall meeting, Mountain House, Lake Mohonk, N. Y. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

American Management Association. Oct. 29 to Nov. 1. Annual convention, Hotel Astor, New York. W. J. Donald, 20 Vesey Street, managing director.

NEW TRADE PUBLICATIONS

Exhaust Steam Valves.—Atwood & Morrill Co., Salem, Mass. Catalog D of 24 pages covers low-pressure valves in considerable variety, running from 2 to 42 in. in size. These are illustrated both by diagram and half tone, sections being given and dimensions for design, showing clearances, etc. The list includes relief valves, flow valves, reverse current and back pressure valves of various types.

Steam Appliances.—Atwood & Morrill Co., Salem, Mass. Catalog E of 44 pages features a general line of steam specialties, including reducing valves, steam traps, automatic receiver and pump governors, back pressure valves, cast iron exhaust heads, balanced lever valves, damper regulators, tank valves, strainers, etc. Illustrations are numerous, prices are given and some of the principal dimensions of most of the types of apparatus covered.

Lubricating Oil Concentrate.—Henry Wells Oil Co., 11 Haymarket Street, London, S.W.I. England. Represented in the United States by Marland Refining Co., Ponca City, Okla. A 20-page pamphlet covering "Tonikol," made on the germ process. The pamphlet is devoted largely to a discussion of why oil lubricates and to friction tests of various types of oil. This particular product is recommended for railroad, steamship and engine uses generally.

Germ Process Oils.—Henry Wells Oil Co., 11 Haymarket Street, London, S.W.I. England. Represented in the United States by Marland Refining Co., Ponca City, Okla. A 20-page pamphlet devoted to a patented method of producing lubricating oil and giving results of tests made under varying conditions. Particular attention is paid to metal rolling where the metals are of such a character that they have a tendency to stick to the rolls, and where the use of this type of lubricant is recommended to avoid sticking.

Pulverized Coal Burning.—Ground Coal Engineering Corporation, Worcester, Mass. An 8-page pamphlet on the "Multi-Mix" method of using pulverized coal for power purposes. The device is designed to accomplish complete mixing of air and pulverized fuel before they enter the furnace, this being done in concentric passages through which the air and coal proceed to the burner. It is claimed that this form of device is far easier on the brick work of the furnace than in the high velocity type with jet formation.

Water Filters.—Graver Corporation, East Chicago, Indiana. Bulletin 501 of 12 pages features the horizontal pressure type of mechanical or rapid sand filtration. It is said to be especially adaptable to small municipalities, to large outdoor swimming pools and to industrial and manufacturing establishments using daily more than 250,000 gal. Descriptions of the various types and details are amplified by tables of capacities, dimensions and weights covering single and multiple units. Specifications are given for the entire equipment.

Sprue Cutter.—Hanna Engineering Works, 1765 Elston Avenue, Chicago. A circular of one page illustrating and describing the Milwaukee sprue cutter for steel foundry service. The weight is about 10,000 lb.; the throat has 9¾ in. reach and 20 in. gap. The motor, running at about 1100 r.p.m., is of 5 hp. d.c. or 7½ hp. a.c.

Foundry Molding Machines.—Hanna Engineering Works, 1765 Elston Avenue, Chicago. Calendar No. 11 of 56 pages covers Mumford molding machines for foundry use, including air squeeze machines, jolt squeeze machines, split pattern machines, and details of all of these. The illustrations show both the different types of machines and installations indicating their use. There are numerous drawings giving the shape and names of different parts, while the tabular matter covers the main features of specifications.

World's Wealth and Public Investment

In a 28-page pamphlet issued by Moody's Inventors Service, 35 Nassau Street, New York, a digest is given of figures covered in a 1200-page book of government and municipal investments. Included in this digest are estimates of the wealth of the principal nations of the world, together with the relation between wealth and population. Among the figures of largest interest to us are naturally those for the six leading manufacturing countries, which are listed in a separate group as follows:

Country	Population	Wealth (Millions of Dollars)	Wealth Per Capita
United States...	108,226,000	286,390	$2,648
United Kingdom	47,767,000	109,107	2,333
Germany	61,654,000	84,158	1,365
France	39,403,000	74,038	1,879
Belgium	7,684,000	10,343	1,346
Switzerland	3,880,000	4,567	1,177

None of the commercial, agricultural or unclassified countries has a wealth estimated as high as that of France in the table above, and only Russia reaches half France's figure. For Russia (1915 figures) the estimate is $73,083,000,000, amounting to $407 per capita. India and Japan are given 35 and 32 billions respectively, with Italy just under 30 billions. All others are below 20 billions. Canada is the only one not in the six listed which has a per capita wealth of over $2,000, the figure being $2,035. On this score Australia is given $1,847, Argentina $1,515, and the others all less than $1,200, China being at the bottom of the list with $60.

A course of 30 lectures on labor and employment management, to begin Sept. 27 and to continue every Thursday evening from 6 to 7.45 p. m., has been announced by the Department of Business Management, New York University, to which application should be made, for further information, at 32 Waverly Place, New York. The lectures will be given by James Dominick Hackett, labor consultant. A separate course of 30 group discussions for Tuesday evenings has also been arranged to cover principles and methods of training employees. The lecturer is John Dietz of the Western Electric Co.

New Books Received

Engineering Non-Ferrous Metals and Alloys. By Leslie Aitchison and William R. Barclay. Pages 300, 5¼ x 8¼ in.; 82 illustrations and 167 tables. Published by Oxford University Press, American Branch, 35 West Thirty-second Street, New York. Price, $7.

Transactions from the American Society of Mechanical Engineers. Volume 44, 1922. Pages 1421, 6 x 9 in.; illustrated. Published by the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York.

Heating and Ventilating Engineers' Guide, 1923. Pages 408, 6 x 9 in., illustrated. Published by American Society of Heating and Ventilating Engineers, 29 West Thirty-ninth Street, New York. Price, $3.

Metals and Metallic Compounds. By Ulick R. Evans. Published by Longmans, Green & Co., 55 Fifth Avenue, New York. Volume 3, The Transition Elements: pages 270, 5¼ x 8½ in.; illustrations 42; price, $4.75. Volume 4, Metals of the "B" Groups: pages 350, 5¼ x 8½ in.; illustrations 32; price, $6.

The Metal & Thermit Corporation, New York, has issued a new thermit rail welding pamphlet, which brings up to date the whole subject of thermit rail welding to cover the many recent improvements in economy and efficiency. It includes detailed instructions, accompanied by illustrations and drawings, showing steps in making the improved thermit rail weld which has greatly reduced the cost per joint. Improved apparatus used in connection with thermit rail welding, such as the self-luting mold box and the new lightweight double-burner preheater, which have accelerated the speed of operation, is described in detail for the first time, as well as illustrations showing results of a ten years' service test of the thermit rail weld, also rail bending and drop tests. Instructions for using thermit for welding compromise joints, constructing frogs and crossings and repairing loose arms of mates and switches, have also been included in complete form. At the end of the pamphlet is a discussion of the theory of rail joints.

Growing Use of Manganiferous Ores

Developments on the Cuyuna Range—Effect of Manganese in Blast Furnace and Open-Hearth Practice

BY L. E. IVES*

AS the subject of this paper is restricted to the development of the use of the manganiferous ores of the Cuyuna range, it will not be necessary to go into the history of the Cuyuna range. Shipments of iron ore from the Cuyuna range were begun in 1911 from the Kennedy mine after several years of exploration and development.

It was not, however, until several years later that it was realized that the range contained not only so-called "straight iron ores" but also iron ores carrying varying percentages of manganese.

Manganese in iron ores was not new for the Lake Superior range, as several grades of such ores had been shipped for some years from the Gogebic and Menominee ranges in Michigan, and in a few instances with considerably less manganese from certain properties on the Mesabi range in Minnesota. The character and the quantity of the manganese ores present on the Cuyuna, however, seemed to indicate a new condition in regard to both the production and the sale of such ores.

The first shipment of manganiferous ore from the Cuyuna range was made from the Cuyuna Mille Lacs mine of the American Manganese Mfg. Co. in 1913, and amounted to 25,000 tons. This was followed by 51,000 tons from the same property in 1914, in which year the Iroquois Iron Co. also shipped about 2000 tons of a 10 per cent manganese ore which had been stockpiled during the previous winter at its Armour No. 2 mine, later operated by the Inland Steel Co. In the same year, also, the Iron Mountain Mining Co. shipped about 600 tons for experimental purposes. Up to the year 1915 the manganiferous ores from these properties were shipped to a number of furnaces, including the Standard Iron Co. in Ontario, Illinois Steel Co. at Chicago, the Dunbar Furnace, Bethlehem Steel Co., Pittsburgh Steel Co., Cambria Steel Co. in Pennsylvania and also some of the charcoal furnaces in northern Michigan and Wisconsin.

The Phosphorus Content

The bulk of these ores, however, was low in phosphorus and high in silica, thus constituting one of the two so-called groups of manganiferous ores which were developed on the range. The second group, developed later, carries considerably lower silica and somewhat higher phosphorus, and it is this class of ore which has been more extensively developed and which appears to be in greater abundance on the Cuyuna range. The ores of this group will range from 3 to 20 per cent in manganese and will not exceed 7 or 8 per cent in silica, with a natural combined metallic content ranging from 43 to 48 per cent in the raw ore. These figures, as well as the moisture content, vary considerably in different properties, but the figures above give a good indication of the range.

During the period of the World War the requirements of the steel industry in this country and the restrictions of imports were such that these low phosphorus high manganese ores found an extensive use in the making of spiegeleisen, which is an alloy of iron and manganese with a low percentage of manganese as compared to that in ferromanganese. The restrictions of the war also caused the United States Government to reduce the specifications of manganese in spiegel with the result that the Cuyuna ores of this class were better adapted for this purpose and this, of course, materially stimulated the production of these ores, as it afforded a much wider and more certain market for them. Considerable tonnages of this class of manganiferous ores from the Cuyuna range were mined and disposed of during the war period, but with the signing of the armistice this business practically dropped off over night and has never been regained in any appreciable amount. It is true that since then some tonnage of ore has been disposed of for this purpose but the production has been very small and intermittent, and it has mostly resulted in disposing of the stockpiles of such ore which had accumulated during the last year of the war.

With the inauguration of the present high tariff on manganese ore and ferromanganese, it had been expected by many in the Lake Superior region that the production of such ores would be stimulated and placed on a satisfactory basis. However, this tariff has been in effect for nearly a year and to date there have been no developments to indicate that such is going to be the result.

Increasing Manganese Content

The use of manganiferous ores in the blast furnace to increase the manganese content of basic pig iron dates back a good many years, but prior to the development of such ores on the Cuyuna range the furnace companies had to depend upon such tonnages as were available from the Gogebic and Menominee ranges in Michigan. The reserves of such ores were not in proportion to the reserves of the ordinary iron ores in the Lake Superior region; and while the furnace companies recognized the advantage to be gained by maintaining a high manganese content in the blast furnace burden, they were never certain of the future supply.

Another factor which has undoubtedly had a bearing in this matter is that such ores from the other ranges were produced mostly in underground operations, with consequent limited production and higher costs as compared to open pit operations.

The Cuyuna ores of the class under consideration are lower in phosphorus than some of the other manganiferous ores produced on the older ranges in Michigan, and as the Cuyuna ores are also very much lower in sulphur than the older range ores, they are more attractive to the furnace man.

The problem that seemed to develop, therefore, in regard to the sale of Cuyuna range ores suitable for use in a basic furnace mixture was one of assuring the furnace man first of an adequate future supply of these ores, secondly, their equal or greater desirability as compared to the old range ores, and further to extend by means of education the use of such ores to furnaces that had not heretofore employed them.

This effort has been quite successful, judging from the record of shipments of manganiferous ores from the Cuyuna range from the year 1916 to 1922. In 1916 the shipments of such ores amounted to 427,370 tons and in 1917 to 365,222 tons; whereas the shipments in 1920 were 604,706 tons and in 1922, 656,105 tons. The indications for the current season are that the shipment of manganiferous ores from the Cuyuna range will amount at least to the 1922 figures if it does not considerably exceed them. The average manganese in these shipments ranges from 6.99 to 12.21 per cent, with an average probably of about 9 per cent. The phosphorus will average close to 0.22 per cent and the silica ranges from a low of 5.59 to a high of 11.10,

*Clement K. Quinn & Co., Cleveland. This is an abstract of a paper read before the Lake Superior Mining Institute, at Duluth, Minn., Aug. 30.

with an average silica content of about 7 or 8 per cent.

There is evidence of the steadily increasing use of manganiferous iron ores in blast furnace practice, at both steel works and merchant furnaces making foundry and other grades of iron. This has been brought about through the wider appreciation of the advantages to be gained by the use of such ores.

Steel Works Practice

Some steel works furnaces have for many years made it their standard practice to use mixtures containing more than an ordinary amount of manganese. Among these the demand is steady and in general for an ore containing from 5 to 10 per cent manganese. It has been demonstrated through actual practice and experiments conducted for the purpose that there are numerous advantages in this and it is now generally accepted that manganiferous ore in the blast furnace has a beneficial effect upon the general operation of the furnace. More recently, however, the use of a high manganese pig iron has been demonstrated to be of advantage in the open-hearth furnace.

These late developments have a direct bearing upon the increasing use of manganiferous ores. While some works prefer to use a large tonnage of ore running comparatively low in manganese, say about 5 per cent, others for various reasons find it of advantage to use a small tonnage of an ore running much higher in manganese. There is no question, however, that present practice involves the use of a mixture carrying a much higher percentage of manganese than would have been used ten years ago. At that time it was only in exceptional cases that an ore containing over 1 per cent manganese was used, while today with most of the important plants in the country carrying over 1½ per cent manganese in their metal, it has become necessary to include in the burden an ore containing at least 5 per cent manganese.

There are a number of definite and valuable facts known concerning the effect of manganese in both the blast and open-hearth furnaces.

1. A high manganese charge is a help rather than a hindrance in blast furnace practice.
2. High-manganese iron improves the quality of open-hearth steel without reduction of tonnage or other injurious effects.
3. High-manganese iron is of very great assistance in meeting the demands for the better grades of steels.
4. Due to better surface conditions steel made from high-manganese iron shows increased yields with ordinary rolling mill practice.
5. Open-hearth production is materially increased by keeping manganese in proper amount in basic iron.
6. Maintaining manganese between certain limits in the iron saves the adding of appreciable quantities of ferromanganese in the ladle.

Increasingly high sulphur fuels are making it more difficult for steel manufacturers to meet sulphur requirements and specifications without additional cost. Manganese is the answer. The efficient way to add the manganese is through manganiferous ore in the blast furnace burden.

Some Possibilities

If manganese in the hot metal is maintained at about 2 per cent, it is possible to run the blast furnace with higher sulphur, leaner slags, increased tonnage and reduced fuel ratio and to deliver to the open-hearth iron as low in sulphur as could be obtained with a low manganese ore charge much lower in sulphur.

The use of manganiferous ore will secure leaner slags and maintain tonnage. With sulphur up to 0.10 per cent at the furnace, it is still possible to deliver iron to the open-hearth through the mixer with 50 per cent of the sulphur eliminated.

The time of open-hearth heats can be materially reduced by using high-manganese iron. Slag can be worked into shape more quickly in this way than with low-manganese iron.

In manufacturing ordinary steel under normal conditions, between 1 and 2 per cent manganese in the iron gives residual manganese in the bath and also saves adding manganese in the ladle at the rate of about 0.7 lb. of pure manganese for each 25 points of manganese in the iron over 1 and up to 2 per cent.

Manganese above 1 and up to 2 per cent in the basic iron will increase open-hearth production 1 per cent for each 25 points of manganese in the iron. This is because basic iron with relatively high manganese is more refined when delivered to the open-hearth, and also because the influence of the manganese on the sulphur reduces delay in finishing the open-hearth heat.

Experiments and experience have demonstrated, if anything, that high-manganese iron is less detrimental to open-hearth furnace bottoms than low-manganese iron. The same is true of ladle linings.

Oxygen red-shortness cannot be offset by carbon, phosphorus or silicon. Manganese will reduce it and is the best preventative agent. This is best accomplished through high-manganese iron and this can best be made by manganiferous ore in the blast furnace.

With a higher manganese content in the furnace mixture, the cost of production is reduced, tonnage increased, and a smaller amount of flue dust is made, on account of a smoother working furnace due to a more acid slag.

Can one assume that thorough deoxidation results from adding a little deoxidizer to a ladle of steel low in manganese and covered with basic slag containing oxides—and pouring almost immediately?

Needs of Blast Furnace

As the production and use of such ores has increased, it has become more and more apparent that the blast furnace man is as much interested in the regularity of the ore, its uniform structure and distribution of the manganese throughout the ore as he is in the total amount of the iron and manganese contained. It has therefore been necessary, as these ores find wider use, to give the blast furnace superintendent more nearly what he wants. Today the furnace superintendent has a number of well-established grades from which he can make any selection in manganese that he desires, and in doing so can be assured of receiving ore that is of excellent structure as well as being uniform in analysis. These grades are established and recognized and fortunately for the operator as well as for the furnace man, the Cuyuna manganiferous ores in their natural state have a splendid structure and this no doubt has helped materially in advancing their use and sale in a market that was not any too favorably inclined when such ores first appeared, and which required the overcoming of considerable opposition and much educating on the part of the producer to convince the furnace man and the steel works man that the ores were available in sufficient tonnages for a future period of years to warrant their adoption as standard practice. The Cuyuna manganiferous ores have now come into their own so far as a market is concerned for the grades suitable for use in making basic pig iron. There is every reason to believe that their use will continue to grow in proportion to the growth of the iron and steel industry in this country and will probably only be limited by the availability of such ore in the future.

Advancement of Sciences Predicted

Great advances in science and human welfare during the next half century were predicted by Secretary Hoover of the Department of Commerce in a message to the 1500 members of the American Chemical Society assembled at Milwaukee Sept. 10, for their fall meeting. "Our future advancement," said Mr. Hoover, "is indissolubly dependent upon our advance in the twin sciences of chemistry and physics and their application.

"Discovery and invention are no longer the function of the garret genius. They are the result of deliberate organized exploration by our men of pure science. New discoveries and their application will come faster and more securely than ever before; and I believe the next half century will be greater in its triumphs of science and in their contribution to human welfare than even the last 50 years, for we are better trained, better organized, better equipped for discovery than ever before."

OXYGEN IN BLAST FURNACES*

Lower Cost and Larger Output Predicted From the Use of Oxygenated Air

The trend of development in smelting and refining is in the elimination of inert matter—that is, material, solid or gaseous, that does not enter into the reactions in the furnace, and which simply passes through, absorbing and carrying away heat and reduced metals therefrom, a heat that otherwise would be utilized in the process. For instance, in making iron in the blast furnace, a process is still employed in which the inert material greatly outweighs the active material, as can be illustrated by the fact that, in the production of one ton of pig iron, three tons of nitrogen is passed through the furnace.

The same is more or less true of all furnace operations which derive heat from the combustion of fuel by atmospheric air. It would seem, therefore, that metallurgical technique, as well as the conservation of our natural resources, would be greatly advanced if the nitrogen passing through the furnace could be diminished. This might be done by substituting oxygen, or a mixture of oxygen and air, for the air now used, and the following discussion shows the possibilities of the application and efficiency of oxygen to some phases of ferrous metallurgy as it exists today.

Availability of Oxygen

In view of the many recent developments in oxygen manufacture, and considering the increasing cost and decreasing quality of our raw materials, the Bureau of Mines has taken the matter of the application of oxygen or oxygenated air to the metallurgical centers for consideration, and has appointed an advisory committee to study the problem.

This committee has made a thorough survey of the existing processes for the manufacture of 99 per cent oxygen. The conclusions reached are that the comparatively small demand for the product has prevented the installation of large units suitable for metallurgical processes, with corresponding economies, and by far the greater proportion of the present cost of oxygen represents the cost of transportation, storage and service. Large oxygen manufacturing plants can be built to serve metallurgical purposes directly which, by virtue of their large production and correspondingly increased efficiency, together with the fact that no compression in cylinders, storage, transportation or service will be required, will be capable of delivering oxygen for the processes at a cost not to exceed $3 per gross ton. In other words, the committee finds that the oxygen industry is now able to make plants for supplying large quantities of oxygen to metallurgical industries at low cost.

Applicability of Oxygen to Metallurgy

The committee has made studies of the possible application of oxygen to ferrous metallurgy in general, to the metallurgy of zinc, to the manufacture of fuel gas, and for some miscellaneous industrial uses. The findings on these theoretical studies are of such a revolutionary character that the members feel the strong advisability of conducting experimental work to verify the truth thereof, as well as to make changes in furnace design and processes in order to take full advantage of the probable benefits to be gained.

The committee has developed plans for experimentally determining the effects of oxygen enriched air upon the operation of the blast furnace, and it recommended that these plans be put into effect as the first step of an extended research upon the general applicability of oxygen to metallurgy.

*Extract from an extensive report by a special committee of the Bureau of Mines, organized to investigate the use of oxygen or oxygenated air in metallurgical and allied processes. It includes the blast furnaces, Bessemer and open-hearth, ferromanganese and artificial gas. The chairman of the committee is M. H. Roberts, consulting mechanical engineer, Bureau of Mines. The author of the report is F. W. Davis, metallurgist, Bureau of Mines, Minneapolis, Minn.

The matter of increasing the oxygen content of the air blown into the iron blast furnace has probably received more discussion than any other proposed metallurgical application of oxygen. The fact, however, that oxygen has always been an expensive commodity has done much to prevent any real analysis being made of the effect of this practice, so that published opinions, being opinions only, differ greatly from one another as to the ultimate result predicted. However, by a careful analysis of both the metallurgical and thermodynamic principles involved, we may predict with some accuracy the effect on furnace operation of any change of this character.

For a comprehensive study we must first consider the furnace itself, and the principal chemical reactions which take place therein. In every blast furnace there are two main sections, namely, the hearth and bosh sections, and the shaft section, each of which has a separate and distinct function to perform. The burden or charge as it passes down the shaft section is heated by the ascending hot gases; the limestone is calcined, and the iron oxides are reduced to a large extent to metallic iron by the action of the hot carbon monoxide. All of the chemical reactions of the shaft section are performed at a comparatively low temperature. In the hearth and bosh section, the slag-forming materials are melted, the silicon is reduced, and the remaining iron oxide is reduced; in other words, the actual smelting is performed in this hearth and bosh section, and all of the work must be done at a very high temperature. Therefore, these two sections of the furnace must be considered as two individual units, the shaft as the preparatory zone, and the hearth and bosh as the actual smelting zone.

Thermodynamic Principles in Smelting

With this idea of the division of work performed in the furnace, it is well to consider the thermodynamic principles involved. The first and second laws of thermodynamics apply to the blast furnace just as much as they do to the steam engine, and for our purpose they may be stated as follows:

1. The quantity of work produced by transformation of heat bears a definite and unchanging ratio to the quantity of heat transformed.

2. The proportion of any given quantity of heat which can be utilized for conversion into work depends upon the temperatures at which the heat is applied and discharged.

Significance of Increased Smelting Heat

In order to comprehend fully the value of this increased smelting heat to the industry, one must realize that conditions up to the present are:

1. The efficiency and rate of operation is governed by the smelting ability of the furnace.

2. The smelting ability is dependent finally upon the amount of available high-temperature heat in the hearth and bosh.

3. This high temperature heat, being generated in the most inaccessible part of the furnace, is absolutely beyond any direct control.

4. Any material changes in hearth heat can be accomplished only by charging fuel in the top of the furnace, and will not be effective until the additional material reaches the hearth, a period of from 10 to 15 hours.

5. No changes in heat application or efficiency in the shaft will be effective on the operation as a whole, inasmuch as they can not change the smelting rate.

With more oxygen available in the blast, the smelting ability of the furnace will be increased beyond the speed of the preparing zone in the shaft, transferring the limiting conditions from the inaccessible hearth section to the shaft section, where any change may be accomplished with comparative ease. This fact will make it profitable to conserve the heat in the shaft section. Up to the present time this shaft heat has usually been in excess of requirements, so much so in many cases as to necessitate the charging of water in the top in order to dissipate the excess heat and protect the top of the furnace. With the hearth heat increased by the addition of oxygen, and the smelting rate accelerated, we will treat more ore in the shaft, which will absorb the additional heat; and as we reach fairly high concentrations of oxygen we will actually find a defi-

ciency of shaft heat. Then we can begin to introduce shaft economies to increase production.

For instance, in present practice, no attempt is made to charge dry ore, the moisture content running from 8 to 15 per cent; also we are making the furnace calcine the limestone, both of which operations could be accomplished outside of the furnace, and the result would be a saving of about 10 per cent of the shaft heat. Another item to be considered in this connection is that when calcining the limestone in the furnace we are increasing the carbon dioxide content of the gas, thereby decreasing its power for reduction of iron. There are doubtless many other economies which may be effected in the shaft section, all depending on increasing the smelting capacity of the furnace sufficiently to make them worth while.

Doubtless the application of oxygen will revolutionize the art of smelting and it will probably change the whole operation and equipment. However, in order to demonstrate the value to the industry of a development of this character, it seems advisable first to adapt the process to present-day equipment. The first thought was to supply a furnace with blast of 40 per cent oxygen, but in this practice there would be insufficient reducing gas, and it would be necessary to recirculate a portion of the top gas. It is estimated this would increase the tonnage by 41 per cent and decrease the coke consumption by 30 per cent. However, in view of the fact that, due to the deficiency of carbon monoxide in the top gas, circulation of this gas would be necessary, the conclusion was reached that for the first demonstration it would be well not to make any changes that would prevent the burden being reduced completely by one passage of the furnace gas. We can, however, decrease the shaft requirements to the extent of charging calcined limestone, which will, of course, increase the limit to which we may go regarding the reducing power of the gas. We can also eliminate hot-blast stoves, supplying wind at atmospheric temperature.

After carefully considering the matter, it was concluded that, in this particular practice, 31 per cent of the oxygen in the blast will be as high as it will be practical to go, and that this mixture, when charged to the furnace cold, will increase the production of the furnace by 18.0 per cent and decrease costs 6.7 per cent.

Results Expected from Oxygenated Air

On the whole, our study of this problem has firmly convinced us that with the application of oxygen to the present blast furnace we will accomplish the following results:

1. Decrease of production costs:
   a. By increasing the high temperature or smelting heat available per unit of fuel,
   b. By removing the necessity for charging more coke than is theoretically necessary,
   c. By rendering hot blast unnecessary, and reducing the initial investment by the cost of hot-blast stoves, at the same time releasing for other use the gas consumed for this purpose.
2. Increase in the present output per furnace.
3. Increase of flexibility of the process, by giving the operator a remedy for any irregularity or trouble occurring in the hearth and bosh section.
4. Increase in uniformity of product, by admitting of much closer chemical control.
5. A change in the limiting factor of the process from the inaccessible hearth and bosh section to the shaft section. This will mean that, in the new process, any economy accomplished in the shaft section will be effective in increasing production and efficiency.
6. Make possible the use of cheaper materials, ore of a lower iron content, and coke higher in ash.
7. In addition to the above, it is believed that the sulphur content of the iron would be reduced by this practice, or, in other words, that we might use a coke higher in sulphur than is today possible.

Welding Manganese Steel to Ordinary Rails

The repair of manganese steel crossings and switches in street railroad work by welding with manganese steel rods led Mr. Roux to experiment with new crossings of ordinary steel, the parts of which exposed to wear and shock are covered with manganese steel deposited in suitable grooves. The effort was made to deposit a steel containing 11.0 to 13.5 per cent manganese and 1.0 to 1.5 per cent carbon, and an account of the work done, illustrated with photomicrographs, is given in the *Revue de Metallurgie* for July.

The current used was 42 cycle alternating with 80 volts pressure and 150 amperes. The rods were 5 mm. (slightly over 3/16 in.) diameter. Their analysis was 13.8 per cent manganese, 1.23 per cent carbon, and the deposit contained 11.0 per cent manganese and 1 per cent carbon. The rod was covered with a thin coating of wound asbestos and underneath the asbestos was a thin wire of aluminum. The original metal, as deposited without any treatment, showed a good austenitic structure. Between the ordinary steel and the alloy steel is a thin transition layer, not more than about eight ten thousandths of an inch thick, which appears martensitic in structure.

The total layer of metal, about ⅜ in. thick, is obtained by depositing three layers each about ⅛ in. thick. Examination after the first layer shows considerable martensite in the original steel due to surface hardening, similar to the effect produced by the slipping of wheels on rails. The next two layers cause the steel to be annealed by the reheating. In the case of switches the smaller amount of metal may show an overheated structure, and to avoid brittleness annealing should be carried out by heating with a blowpipe.

The experiments show that it is easy to obtain by electric welding a deposit of manganese steel of the composition and structure desired. The rod used should be high enough in manganese and carbon to allow of the losses that take place. The brittleness of the original steel is increased only if the cross section is too small, for example, with switch points.

The thin layer of martensite cannot be avoided. It is transitional in composition between ordinary and manganese steel, and its normal structure is martensitic, and its brittleness is accentuated by its thinness. This explains why the deposited metal does not adhere better to the rail. A good solution of this problem would be to make dovetailed openings on the surface to be covered or cylindrical holes with axes inclined to the surface. These would be filled by metal during the operation and increase adherence, which was proved by subjecting a rail so covered to a shock test.

G. B. W.

Oil Exposition at Tulsa

The International Petroleum Exposition and Congress will be held at Tulsa, Okla., Oct. 8 to 14. Included among the exhibitors will be the following:

American Cast Iron Pipe Co., American Metal Hose Co., Bessemer Engine Co., Blaisdell Machinery Co., S. F. Bowser Co., Bradford Motor Works, Bridgeport Machine Co., Blackman, Hill, McKee Machinery Co., Burns Tool Co., Calorizing Co., Columbian Steel Tank Co., C. & G. Cooper Co., Crane Co., DeLaval Separator Co., Graver Corporation, Hill Clutch Co., Hinderliter Tool Co., Hudson Wire & Iron Co., Harrisburg Pipe & Pipe Bending Co., Interstate Pipe Co., Jarecki Mfg. Co., Key Boiler Equipment Co., Landis Machine Co., Leader Iron Works, Link Belt Co., Lohmann Machine Co., A. Y. McDonald Mfg. Co., National Tube Co., Oil Well Supply Co., Oxweld Acetylene Co., P. H. & F. M. Roots Co., Joseph T. Ryerson & Son, Inc., Standard Machine & Tool Co., Schaffer & Budenburg Mfg. Co., Sullivan Machinery Co., C. J. Tagliabue Mfg. Co., Trimont Mfg. Co., Truscon Steel Co., Henry Vogt Machine Co., Westinghouse Electric & Mfg. Co., Wheeling Steel Corporation, Wilson Welder & Metals Co., Walworth Mfg. Co., Williamsport Wire Rope Distributing Co.

Edward F. McIntyre, Tulsa, is general manager of the exposition.

The National Fire Prevention Exposition will be held in New York Oct. 8 to 13 at the Seventy-first Regiment Armory, New York, in connection with an International Fire Prevention Congress. Headquarters of the exposition are at 25 East Twenty-sixth Street, New York.

German Founders' Zeal for Their Art

(*Continued from page* 688)

translated. A little "joshing" of the gentleman in charge revealed the fact that this trust got along very nicely with the Government, which bothered it very little so long as the German foundries were not overcharged. The foreigner might be charged all the traffic would stand.

A full line of designs of foundries was available. A small laboratory was exhibited as the "Normal Laboratorium" or standard foundry laboratory. Among the beautiful scientific displays was that of E. Leitz, of microscopes with photographic apparatus. The most complete outfit of this kind enabled the observer to place the polished specimen on a metal table and at once to see the enlarged structure in most delicate presentation on a light green glass screen, and, if desired, to proceed and photograph it. The perfection of workmanship of the entire apparatus can only be appreciated when actually seen. The price, around 800,000,000 marks—or $200 at the time—seemed remarkably low.

A number of photographs in series illustrated step operations in the production of special lines of castings, so that the interested foundryman could study the production routine without going to the particular shop. A number of soil pipe castings were exhibited which had been cast in horizontal position. Some of them were sawn in two longitudinally, showing the perfection of the metal within the casting. It is a pleasure to see that foundries can make soil pipe in green sand, the thickness of metal perhaps 3/16 in. and the length 10 ft. They are cast with four gates along the side and come out perfect. It is understood that sufficient phosphorus is added in shape of the E-K briquettes of commerce to bring up the fluidity of the molten iron to the necessary point.

Welded Radiator Sections

Economy is practised at every point in Europe, and hence it was not surprising to see radiator sections which had been welded up electrically. On the other hand the fact that an entire room was devoted to displaying books on foundry practice would show that this is a subject on which the German mind and purse are open. No German foundry exhibit is without art castings in profusion. Further, a large number of core oven designs were shown. Castings made in multiple molds, some 14 high, looked very fine. Several testing machines of entirely different design from those seen in America were on exhibition, and some of the American make of molding machines were under operation in addition to the German ones.

The question of molding sand preparation came in for considerable attention, and an unfamiliar sight to American eyes was the new cupola lining material that is rammed up in place instead of using fire brick, mica schist and heavy daubing.

The new development in cast iron, called "pearlitic cast iron" by the inventor, was shown and pieces put under the microscope actually do show an entire structure of pearlite and graphite, as against the ordinary cast iron of ferrite and graphite.

All entertainments previously arranged for had been cancelled in view of the gravity of the political and industrial situation. Holding the exhibition at all can be considered heroic in the face of the universal despair seen everywhere outside of the hotels and places of amusement. Delegations of foundrymen came from Norway, Sweden and Denmark. Three Americans were present, namely Jesse L. Jones, of the Westinghouse Electric & Mfg. Co., and Dr. and Mrs. Richard Moldenke, Watchung, N. J.

Technical Sessions

The technical sessions were opened on Wednesday, Aug. 22, in the educational building, attached to the university, which was founded by a public spirited citizen of Hamburg over a hundred years ago to lay the foundation for industrial education by which future generations might benefit. It is called the Curio House, from the name of the founder. Special lectures were given partly in the exhibition building and in the University of Hamburg.

The first paper of the Wednesday session was by Dr. Schimpke, who discussed the education of foundry engineers. As the great majority of foundry superintendents and managers of Germany are technical men who have entered the foundry by way of a mechanical engineering training, and the foundry metallurgist as apart from the ordinary foundry laboratory is a rarity, the information given and much of the discussion that followed is not of special interest to American foundrymen. However, Dr. Osann brought out the point that it is as essential to train foundry teachers as to provide for the students.

Dr. Kuehnel read a paper on segregation phenomena in castings. He illustrated the subject by many screen pictures and showed by analysis how the elements moved about from surface to interior and the reverse. He built up a theory of the formation of primary and then secondary groups of crystals from the surface inward, with still liquid metal between them, and held that most of the phenomena observed in the way of segregation were not connected with pressure conditions within the castings but from partial vacuum. This was objected to in the discussion, particularly as the idea was applied by the author to annealed malleable castings and the so-called inverted chill in gray castings—that is, a white core or portion within a gray surounding surface.

Contraction and Shrinkage

The third paper of the first session was by Dr. O. Bauer, on an investigation to determine whether there is a relation between the contraction of a casting and the interior shrinkages therein. This very elaborate work is in effect a continuation of the investigations by Professor Wuest, who used a very pure low carbon steel as the basis of his tests, and obtained his curves by addition of silicon, manganese sulphur and phosphorus respectively in progressive quantities and observing the contractings. Dr. Bauer took a carbon-iron of great purity—charcoal iron—melting his mixtures in the crucible. A special bar with enlargement near one end gave the interior shrinkages. This paper —as well as all the others presented—was not to be had at the time, but will be duly published, when more extended notice can be given the matter. The author claimed to have found satisfactory evidence of a relation between the two phenomena, which, however, was doubted by others present, as dissolved oxide of iron and its effect of increasing the interior shrinkages had not been considered in the tests made—in fact, could not very well be.

The acting chairman, Dr. Wedemeyer, in opening the meeting spoke feelingly of the absent Dr. Werner, welcomed the delegates from the several societies, greeting Dr. Moldenke as representing the foundrymen of America on the occasion, and called attention to the several investigations under way by the association. Among these was one on the strength of cast iron, in charge of Prof. Rudeloff of the Government Bureau of Standards. There were also an investigation by a committee on electrical welding, one on difficulties in contractual relations between foundrymen and their customers; an investigation on the lining up of cupolas and finally, one by a committee on molding sands. The chairman further called attention to the gravity of the times and asked the foundrymen to look out for the impending crisis facing the foundry industry of Germany just ahead, with all that this meant to every individual concerned.

In addition to the three lectures on the program, a supplementary one was given by Director Sipp of Mannheim, who discussed "pearlitic cast iron," though little was brought out not already published in America. Much interest was shown in the departure, which remains to be judged as it is tried out in different lines of work. In spite of the cancellation of all entertainments, the foundrymen of Hamburg insisted on a social evening, where they and their ladies entertained the foundrymen of the convention.

The rest of the program of the Verein Deutscher Eisengiessereien, lasting through the week, was of a

business character, the internal affairs of the association, as well as matters of trade, price adjustments, labor and general economics coming in for attention. Thursday, Aug. 23, was given over to the sessions of the Foundry Engineers' Society. The first paper was by Hubert Hermanns of Berlin, who spoke on the heat balance of the bloomery processes. Then came P. Laval, of Magdeburg with a very valuable paper on the acid Bessemer process, in which he indicated the possible economic advantage of going back to bottom blow where the tonnage came to five or more per blow. The discussion brought out several ideas in regard to preventing or removing the skulls forming at the mouth of the converter; the efficacy of these, however, was doubted.

Molding Sand Tests

The important paper of the day was a report by Dr. J. Behr, geologist of Prussia, who as chairman of the committee on molding sands, had done some splendid work on this subject, notably from the geological standpoint. The general and sectional maps shown as covering the molding sand deposits of Germany were certainly fine and useful, and would be of great interest to the molding sand research committee working in America. The methods of test followed parallel lines with those of the A. F. A. Committee, but were not so elaborate. One new point is to be noticed, and that was in connection with the valuation of the clay content of a sand. The German method differentiates between the colloidal portion of the clay of a molding sand and the clay that is not in this form. Hence the dye test is not used, but the method of Misterlich for determining the hydroscopic capacity of the clay portion in percentage. This point should be well worth studying, as a sand may have a high clay content and still be of poor bonding value unless the colloidal portion is sufficiently high. During the discussion Dr. Moldenke described the work of the American Committee shortly and suggested reciprocal cooperation between the respective committees of the two countries, which suggestion was enthusiastically received. As an interesting side light, Dr. Behr showed a molding sand preparation machine built under orders of Frederick the Great and still in operation, though now destined for a museum. It consists of a trip-hammer run by a water wheel, the hammer striking the floor and crushing any lumps of sand placed between. The excuse for still running such a primitive apparatus was that the man operating it was well trained for the work.

Psychological Tests of Workers

A further paper by Dr. Sterner-Rainer on modern melting furnaces concluded the morning session. In the afternoon, a series of moving pictures of foundry operations was first shown, after which came an interesting talk on "Adaptability Testing of Operatives." This was a psychological discussion on the theory and methods of sizing up men by actual test in various ways, to learn whether they would prove of value for the work picked out for them. It was but the beginning of more extended studies and should prove of highest interest in the line of efficiency work. The address was by Professor Rupp of Berlin. A final lecture by Professor Biehle of Bautzen on the casting of bells completed the program.

Summarizing the meeting in a general way, it may be said that the exhibit attracted the crowds of foundrymen, as is usual, but there were many parties of students coming from the schools of the city and towns near by, led by their teachers. There were no visitors present for mere curiosity. The papers were all good, but too much on theoretical lines. Discussions were limited as the papers had not been preprinted. The contrast, as a consequence, between the meetings of the German and the American societies is quite marked. Further, the papers were read in full, which meant some of them an hour long and one appreciates the American present custom of limiting the presentation of any paper to ten minutes, and having the discussion unlimited. Unquestionably the German society will undertake these improvements in practice the moment funds will allow it.

American Foundrymen in England

LONDON, ENGLAND, Aug. 28.—After a smooth passage across the Atlantic, the steamship Leviathan landed the American party of foundrymen, some 25 in number, at Southampton, whence they entrained to London, arriving at the Hotel Cecil Aug. 24, at 5.30 p. m. Saturday morning the party was welcomed by the British reception committee, which was augmented later in the day by F. J. Cooke, past-president of the Institute of British Foundrymen and of happy memory of the Rochester convention of the American Foundrymen's Association. Several American foundrymen had arrived simultaneously by way of the Continent, and the morning was given over to greeting friends and getting settled.

On the afternoon of Aug. 25, the party was taken to Windsor Castle by auto-bus and shown this beautiful and extensive historic pile. Particularly the state apartments of the famous regal residence were enjoyed by those who had not been across before. Tea was served at the White Hart Hotel, at Windsor, and on the return trip Hampton Court was passed. Sunday was given over as a day of rest and the visitors could be seen at Westminster Abbey and the National Galleries.

On Monday morning, the party was motored out to the large foundry of J. Stone & Co., Ltd., where one of the finest foundry plants of England was inspected. These works are at Charlton and make more and larger propellers for marine purposes than any other foundry in the world. The inspection was a treat for more than the non-ferrous men, for the huge castings for the big liner propellers are made here, and an opportunity was given to see the molding methods in detail. It was only at the banquet of the evening that the American visitors found out that theirs was the first party of visitors ever allowed into these works since it was built. After the visit luncheon was given at the Ship Hotel at Greenwich and the party motored through places of interest back to London.

A formal highly enjoyable dinner was given the American visitors, by the London branch of the Institute of British Foundrymen and the Iron and Steel Institute, in the evening at Hotel Cecil. President Lambert of the British foundrymen presided and the principal addresses of welcome were made by Sir Robert Hadfield, as past-president of the Iron and Steel Institute, substituting for Francis Samuelson, who could not attend; and Sir George Goodwin, vice admiral of the Navy and president of the Institute of Marine Engineers.

President G. H. Clamer of the A. F. A. responded in a happy vein, and expressed the thanks for the visiting delegates. Short addresses by Mr. Lambert, Past President Stubbs of the British foundrymen and Mr. Minich followed and the speeches of the evening were concluded by a toast to the ladies by Colonel Cheesewright and responded to by Britain's foundry lady, Miss J. M. V. Aynesley. Musical selections and recitations were delivered during the evening, and the party adjourned at midnight.

Tuesday, Aug. 28, in the afternoon the American party entrained for Sheffield.

The list of Americans registered at London and planning to attend the Paris convention is as follows:

Mr. and Mrs. G. H. Clamer and daughter (Ajax Metal Co.), Philadelphia; Dr. and Mrs. Richard Moldenke, Watchung, N. J.; Walter Wood, R. D. Wood & Co., Philadelphia; Mr. and Mrs. Verne E. Minich (American Foundry Equipment Co.), New York; Mr. and Mrs. Ralph West (West Steel Casting Co.), Cleveland; Mr. and Mrs. P. Krentz (Buffalo Foundry & Machine Co.), Buffalo; Mr. and Mrs. G. W. Knotts (United Engineering & Foundry Co.), Youngstown; Mr. and Mrs. John Hill (Hill & Griffith Co.), Cincinnati; Mr. and Mrs. J. S. McCormick and children (J. S. McCormick Co.), Pittsburgh; Jesse L. Jones, Westinghouse Electric & Mfg. Co., East Pittsburgh; C. H. Gale, Cleveland; W. E. Dunn, Jr., Southern Metal Trades Association, Atlanta, Ga.;

Americans En Route to the International Foundry Congress Which Opened in Paris, Sept. 12, Were Entertained in London by the Iron and Steel Institute and the Institute of British Foundrymen. On Aug. 27, the delegation visited the works of J. Stone & Co., Ltd., at Charlton. Photograph from Wide World Photos.

George H. Kramer, Kramer Brothers Foundry Co., Dayton, Ohio; George Wadsworth, Wadsworth Core Machine Co., Akron, Ohio; Q. S. Snyder, Phoenix Roll Works, Pittsburgh; Mr. and Mrs. C. S. Gilbert (Canada Iron Foundries, Ltd.), St. Thomas, Ont.; C. Barnhill, Fay & Scott, Dexter, Me.; Mr. and Mrs. R. E. Turnbull (Arcade Mfg. Co.), Chicago; E. W. Campion, Buckeye Steel Casting Co., Columbus, Ohio; L. S. Lehman, Baltimore; C. S. Bell, C. S. Bell Co., Hillsboro, Ohio; W. S. White, J. S. White Co., Pawtucket, R. I.; William H. Nichols, W. H. Nichols Co., Brooklyn; James Linkplate, Michigan Malleable Co., Detroit.

In addition to those listed, Stanley G. Flagg, Jr., of Stanley G. Flagg & Co., Philadelphia, will meet the party at Paris.

Making Open-Hearth Bottom

(*Concluded from page 674*)

it is required to perform the work of one ton of calcined stone. This is because of the shrinkage which occurs when CO_2 is driven off by the heat of the furnace. For this reason, some open hearth superintendents have eliminated raw stone altogether.

It is difficult to place refractory material exactly where it is wanted by the shoveling process. This not only increases the consumption of lining materials, but tends to build up bottoms of furnaces. Operators of the mechanical device at Warren find they can repair the furnaces without wasting refractories. In addition, the syndolagger has enabled the Trumbull management to dispense with carrying refractories on the charging floor, which always resulted in some loss.

According to A. G. Smith, steel works superintendent, and John Blair, senior melter, at the Trumbull plant, most satisfaction is derived from the fact that since the machine makes work easier for the men they are more contented and that makes the plant a desirable one in which to work. Today only English speaking men are working either on the floor or around the pits.

Iron and Steel Exports

In both May and June Canada was the principal customer for iron and steel products shipped from the United States, according to figures of the Department of Commerce. Japan occupied second position in May and third in June, while Cuba was in second position in June after having been third in May. The principal tonnages are covered in the table, which shows the first 10 of our June customers and includes all cases where as much as 5000 tons was shipped in either month:

	May	June
Canada	78,012	68,774
Cuba	18,128	20,712
Japan	44,806	18,127
Argentina	7,045	7,430
Mexico	9,012	6,386
United Kingdom	5,971	6,173
Kwangtung*	2,975	6,172
Brazil	3,089	4,579
Philippine Islands	1,507	3,795
China	5,234	3,629

*Leased territory.

Exports of Coal and Coke Increase

WASHINGTON, Sept. 10.—Coal and coke have advanced to second place among America's export commodities, moving from fourteenth position, as shown in the quarterly analysis of foreign trade issued by the Foreign Commerce Department of the Chamber of Commerce of the United States. This movement is disclosed in a comparison of coal exports during the first six months of the year with the corresponding period in 1922. It gives coal the highest place it has ever had.

Automobiles and their parts have taken third place in exports, also their highest position, and agricultural machinery, copper rods, electric motors, zinc, spelter, have made decided gains. Cotton remains secure as the country's most important export commodity.

The report speaks of references which have been made to a depressed condition of foreign trade and gives some figures on individual commodities. It says:

"As compared with the average exports for the five years just preceding the war (1908-1913) refined copper was off 20 per cent; steel rails were off 41 per cent; iron pipes and fittings were off 11 per cent; iron wire was down 7 per cent; nails had dropped 28 per cent."

Average Automobile Lasts 6.7 Years

In an analysis made by *Automotive Industries* and based on automobile registrations in all of the States, and the annual production and exports and imports of cars, it has been found that the average life of the cars retired during the past year or two has been about 6¾ years. This replaces the figure of 5 1/3 years established as the result of a similar analysis two years ago.

Total United States registration at the end of 1922 is given as 12,239,114 cars. Production during the year was 2,659,064, of which 78,234 or nearly 3 per cent were exported. Only 456 cars were imported. Those placed in service in the United States amounted, therefore, to 2,581,276. Those retired during the year figured out at 806,167, this being the excess of the number placed in service in 1922 over the increase (1,775,109) during the year in the total number of registrations.

June sales of the Greenfield Tap & Die Corporation, Greenfield, Mass., were 26 per cent larger than those for the corresponding month last year, while July sales increased 20 per cent and August 14 per cent.

Machinery Markets and News of the Works

A FEW BRIGHT SPOTS

Some Attractive Orders but Business on the Whole Is Quiet

Gray & Davis, Inc., Boston, Purchase a Large Number of Machine Tools—Axle Company Also Important Buyer

Despite the general quietness of machine-tool markets, some very attractive business has been placed. Conspicuous in recent buying has been that of Gray & Davis, Inc., Boston, whose purchases, it is estimated, will reach $100,000. This is the largest business placed in New England since early in the year.

The Eaton Axle & Spring Co., Cleveland, was another large buyer, having placed an order with a Cleveland dealer for 17 machines. The Ford Motor Co., Detroit, placed 12 turret lathes with a Cleveland manufacturer. The William Powell Co., Cincinnati, bought nine hand screw machines.

Automobile manufacturers are buying a few tools, single orders predominating. Most of this business is for preparation for next year's demand and for work on the new models which are being brought out for 1924. The safe companies at Hamilton, Ohio, have been consistent buyers in recent weeks.

There are scattered orders for single tools from the railroads, but no important railroad buying is in sight. The Chicago, Indianapolis & Louisville is asking for prices on several woodworking tools.

New York

NEW YORK, Sept. 11.

THE past week has brought no interesting developments in the local machine-tool market. Inquiries and sales are few. Used machines are more in demand than new tools. A few railroad orders are still being placed, but none of importance. The Pennsylvania Railroad has ordered a 90-in. wheel quartering machine, the Seaboard Air Line has bought two 100-ton bushing presses and the Bethlehem Steel Co. has bought a 6-ft. radial drill. The Davis Equipment Co., 50 Church Street, New York, is in the market for a car wheel press of 200 tons capacity and a portable crank pin press of 200 tons capacity. The Bertolette Machine Tool Co., 357 West Side Avenue, Jersey City, is inquiring for a Blanchard vertical grinder, a Pratt & Whitney vertical grinder and 42, 60 and 72-in. vertical boring mills. The machine-tool trade is confident that there will shortly be a better demand for tools, but the past week has brought no indications of a resumption of activity.

The Columbia Malleable Iron Works, Euclid and Atlantic Avenues, Brooklyn, has preliminary plans for a one-story foundry and machine shop to replace the plant recently destroyed by fire. Holmes & Winslow, 134 East Forty-fourth Street, New York, are architects.

The United Metal Hose Co., 532 West Twenty-second Street, New York, has inquiries out for a back-geared screw machine, 1½ to 2 in. capacity.

The Master Rule Mfg. Co., 841 East 136th Street, New York, will commence the erection of a new two-story plant, 75 x 100 ft., on 136th Street, near Willow Avenue, to cost $25,000. Carl M. Nicholson is president.

Officials of the Bridgman Smith Co., 487 Kent Avenue, Brooklyn, manufacturer of paper boxes and containers, have organized the Bridgman Smith Patents Co., to manufacture special paper box-making machinery and mechanisms. The company is headed by H. B. Smith and J. G. Meyers.

The Savage Arms Corporation, 50 Church Street, New York, with plant at Utica, N. Y., is perfecting plans for expansion in its electric washing machine department to increase the output from 1200 to 2000 machines a month. The company is also arranging for the manufacture of a new electrically-operated refrigerator.

The Superintendent of Light Houses, Staten Island, N. Y., will take bids until Sept. 19, for 4000 lb. of brass castings, for delivery from Oct. 1 to Dec. 31, proposal 15606, until Sept. 21 for 12,000 lb. of iron castings, same period, proposal 15620.

Eugene Seavey, 359 Pearl Street, New York, operating a general machine works, has organized the C-V Products Corporation, with capital of $25,000, for the manufacture of mechanical devices, developing the local plant for this purpose. B. A. Daly is also interested in the new company.

The Watson Elevator Co., 407 West Thirty-sixth Street, New York, is arranging for enlargements in its machine shop, service and repair departments, and will occupy the entire buildings at 407-9 West Thirty-sixth Street. The general manufacturing plant will be maintained at Hoboken, N. J., as heretofore.

A two-story automobile service and repair building, 155 x 200 ft., to cost about $200,000, for company motor trucks and cars, will be erected on White Plains Avenue, New York, by the New York Telephone Co., 15 Dey Street, under the name of the New York Telephone Realty Corporation. McKenzie, Voorhees & Gmelin, 432 Madison Avenue, are architects.

The Universal Pipe & Radiator Co., New York, has been organized by officials of the Iron Products Corporation, 41 East Forty-second Street, to take over and expand the different plants and subsidiary organizations.

The Fairchild Aerial Camera Corporation, 136 West Fifty-second Street, New York, plans for the construction of a one-story machine and repair shop at its proposed hangars and aeroplane terminal on Long Island, for which a site will soon be selected.

The M. W. Kellogg Co., 117 Westside Avenue, Jersey City, N. J., manufacturer of pipe, pipe bends, steam specialties, etc., has plans for a three-story addition on Hackensack Avenue estimated to cost $30,000. A crane runway will also be constructed.

The Passaic Valley Sewerage Commissioners, 900 Chamber of Commerce Building, Newark, will receive bids until Oct. 2 for pumping machinery and equipment for the Wallington pumping station, Wallington Borough, including three steam-engine driven centrifugal pumps, one of 25,000,000 gal. and two, 15,000,000 gal. per day, capacity; three vertical boilers; two 10-kw. generators, with auxiliary machinery. Bids will be taken at the same time on an alternate proposal for equipment for complete electric operation, eliminating all steam apparatus. Joseph H. Quigg is clerk of the commission.

The General Water Supply Co., Westmont, N. J., will install an electrically-operated pumping plant at Crystal Lake, with capacity of about 1,000,000 gal. per day.

The Montclair Ice Co., Pine Street, Montclair, N. J., will commence the construction of a one-story plant, 125 x 155 ft., to cost about $100,000 including machinery.

Power equipment, conveying and loading machinery, etc., will be installed in the new two-story plant to be erected on Duffield Avenue, Jersey City, N. J., by the Cinder Brick & Tile Co., care of J. W. Edwards, 1 Exchange Place, estimated to cost $30,000. C. H. Ziegler, 75 Montgomery Street, is architect.

Export Opportunities

J. W. Wallace & Co., 246 Wakefield Street, Wellington, New Zealand, desire to obtain exclusive sales agencies in that country for railroad and tram rails, tubular telegraph poles, copper and aluminum wire, shovels, undercarriage springs for vehicles and all rolling stock, horse shoes, reinforcing rods, steel conduit, insulators, picks.

H. L. Tyrer, Apartado No. 4, Cartagena, Colombia, South America, is contemplating the expansion of his plant,

The Crane Market

WHILE a few new inquiries for overhead and locomotive cranes have appeared since Labor Day, the volume of business closed is small and the crane market generally could not be considered particularly active. One of the outstanding inquiries from the standpoint of total cost is from the Government of the Philippines, 17 Battery Place, New York, and calls for two 15-ton and eight 2-ton, semi-portal, revolving jib cranes for installation on docks at Manila, P. I. These cranes are understood to be somewhat similar to those contracted for by the city of New York for the piers on Staten Island, which were leased to the Pan American Terminal & Dock Co. Bids will be opened Sept. 28. Another export inquiry comes from Hughes & Co., 40 Rector Street, New York, and is for a 30-ton gantry crane for Rio de Janeiro, Brazil. Viele, Blackwell & Buck, 49 Wall Street, New York are in the market for a 60-ton, 47-ft. 8 7/16-in. span overhead traveling crane for Kipawa, Canada. The New York Central & Hudson River Railroad is reported to have closed on a 25-ton stationary gantry crane. The Riverside Steel Casting Co., Lincoln Highway and Passaic River, Newark, N. J., is said to be receiving bids on a 10-ton 40-ft. span electric crane. The Power Machinery Exchange, 1 Montgomery Street, Jersey City, N. J., is prepared to purchase a 3½-ton and 10-ton overhead cranes, hand power or electric, and is also in search of a 25-ton and 50-ton electric cranes. The Edison Illuminating Co., Boston, Mass., has purchased a 20-ton, 20-ft. span, 3-motor overhead crane from an unnamed builder and the Congoleum Co., Philadelphia, has closed on a 2½-ton, 62-ft. span, 3-motor overhead traveling crane.

Among recent purchasers are:

Manila Railroad Co., 17 Battery Place, New York, two 50-ton, overhead traveling cranes for Manila, P. I., from the Cleveland Crane & Engineering Co.

Vacuum Oil Co., New York, a 6-ton, 35-ft. span hand power crane from the Reading Chain & Block Corporation, through Arthur Appleton, New York.

Pittsburgh County Railroad Co., Busby, Okla., a 5-ton, 16-ft. 9-in. span hand power crane from the Reading Chain & Block Corporation, through Arthur Appleton, New York.

McIntosh & Seymour Corporation, Auburn, N. Y., a 20-ton trolley from an unnamed builder.

General Engineering & Management Corporation, 165 Broadway, New York, a 10-ton. 45-ft. span hand power crane for the Trenton Gas & Electric Co., Trenton, Mo., from the Reading Chain & Block Corporation, through Arthur Appleton, New York.

Pittsburgh Plate Glass Co., a 6-ton and four 7½-ton cranes for its Creighton, Pa., plant, from the Alliance Machine Co.

Henry L. Doherty & Co., 60 Wall Street, New York, a 100-ton overhead traveling crane reported purchased but formal order not yet awarded.

now making wire nails, to include the manufacture of bolts, nuts and rivets and is interested in receiving catalogs and other information about machines for this purpose.

Vignier Freres & Cie, 21 Boulevard des Lices, Castres, Tarn, France, desires to communicate with a maker of a device for holding the leaves of a loose leaf note book, the width of the leaves being about 3 in. (75 mm). A sketch with dimensions and price of the device is desired.

New England

BOSTON, Sept. 10.

GENERALLY speaking, August turned out better than most of the New England machine tool trade expected. Contrasted with the same period last year, the 1923 showing was very much better. September starts as though August's aggregate business in this territory would be at least doubled. Buying of shop and production equipment by Gray & Davis, Inc., Cambridge, Mass., automotive parts and accessories, will materially bolster up business this month. Estimates of purchases of both new and used tools made by this company are in the neighborhood of $100,000. Much of the machinery was bought direct from manufacturers, a majority being located in this territory. The purchase is the largest since that of the Saco-Lowell Shops, Boston, earlier in the year.

A list of some 27 shop tools will, according to report, be closed shortly by a cotton mill for a Southern subsidiary. The company already has placed its motor requirements, the General Electric Co. getting practically all of the business. Aside from the Gray & Davis business, individual sales of new machinery have been in lots of one or two, with a slight increase in the aggregate over the previous week. Used tool sales include two gear cutters, a Brown & Sharpe surface grinder, an upright drill, a 14-in. lathe, two turret lathes and two upright drills. The used machinery market, however, is quieter than it has been for weeks, due to the increase in the number of auction sales in this territory. With the market having hardly recovered from the Government sale at Squantum, Quincy, Mass., there is a sale today at Providence, of a large list of machines. Many of the tools sold at Squantum were taken by New York State, New Jersey and Philadelphia buyers.

The Brown & Sharpe Mfg. Co., Providence, R. I., has issued new price lists on small tools, which show some reductions on micrometer sets. Set No. 133 heretofore listed at $28, is now $22.50; No. 134, which was $63.75, is now $51.75; caliper set No. 137, formerly $109.50 is now $90, and set No. 138 is $145.25, formerly $163.75.

Bids are asked by John H. Wisbach, 1123 Commonwealth Avenue, Boston, automobile bodies, on a contemplated one-story, 80 x 89 ft. plant on North Beacon Street, Allston, Boston.

Papers have been placed on record showing the sale of considerable water front land in Salem by the Boston & Maine Railroad to the Salem Terminal Corporation, the latter controlled by Charles H. Tenny & Co., Boston. The corporation plans the erection of coal handling plant and superpower plant. Crane and machine shop equipment will be required.

The A. P. McCullough Mfg. Co., 216 High Street, Boston, has under consideration plans for enlarging its machine shop. Heavy duty machine tools will be required.

Machine shop and manual training equipment will be required for a three-story, 230 x 232 ft., $700,000 school to be erected by Chelsea, Mass., plans for which are being drawn. Bids will be asked about Sept. 15.

Permit has been granted the Union Mfg. Co., 221 Pleasant Street, Fall River, Mass., textiles, to build a one-story, 26 x 364 ft. unit. Motors and other equipment are required.

The Roy Mfg. Co, 192 Granite Street, Quincy, Mass., portable oil servers, has reorganized under the same firm name with Chester I. Campbell, president, and James E. Harcourt, general manager. The company has indefinite plans for expansion.

Foundations are being laid for a three-story and basement building, 90 x 100 ft., at the plant of the Judd Paper Co., 166 Race Street, Holyoke, Mass., estimated to cost $80,000, for which plans were prepared by George P. B. Alderman & Co., 316 High Street, Holyoke, architects.

The Connecticut Light & Power Co., Milford, Conn., will commence the construction of a new power plant on the Housatonic River, estimated to cost $675,000, including equipment.

The General Electric Co., Schenectady, N. Y., will increase production at its plant at Bridgeport, Conn., including the development of a new department for the manufacture of rubber-covered wire. Other departments will include the production of flexible steel conduit, armored cable, steel outlet boxes and covers, and kindred equipment heretofore produced at other works.

The Wilcox-Crittenden Co., Middletown, Conn., manufacturer of marine hardware, etc., has awarded contract to C. O. Stone & Sons, Inc., 111 South Main Street, for a three-story addition, 60 x 60 ft., estimated to cost $45,000.

The Oakville Pin Co., Oakville, Conn., has awarded contract to the J. W. Ferguson Co., Paterson, N. J., for a two-story addition, 70 x 120 ft., estimated to cost $43,000

In connection with the liquidation of the American & British Mfg. Co., Bridgeport, Conn., property of the company will be sold at auction Oct. 1-3, inclusive, including equipment.

Foundations will be laid for the construction of a one-story machine shop, 50 x 100 ft., at the plant of the Shawmut Engineering Co., Freeport Street, Dorchester, Mass.,

estimated to cost $25,000. Headquarters are at 24 Milk Street, Boston. E. F. Hathaway is general manager.

Bids are being asked on a general contract for a three-story addition to the plant of the Davol Rubber Co., Point and Eddy Streets, Providence, R. I., to cost $80,000. F. P. Sheldon & Sons, Hospital Trust Building, are architects.

Baltimore

BALTIMORE, Sept. 10.

AN expenditure of $6,500,000 will be made during the year by the Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, including work now in progress. Within the next twelve months, about $1,000,000 will be used for extensions at the Westport generating plant, to include the installation of two turbo-generators. Extensions will be made at the Penn Street power house to cost $100,000. A new gas purifier house will be erected at the Riverside plant, estimated to cost $200,000 including equipment, and waste heat boilers and other equipment will be installed at the Spring Garden station.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Sept. 25 for 8,600 lb. of iron or steel washers, schedule 1291, for the Norfolk Navy Yard; until Oct. 2 for bolts and nuts for the Boston and Mare Island Navy Yards, schedule 1290.

The Crown Coal Co., Salem, Va., M. J. Anderson, president, recently organized with a capital of $250,000, is planning for the installation of electric power and mechanical equipment on a tract of 60 acres, including hoisting, conveying and other machinery.

The D. M. Lea Co., Main and Twentieth Streets, Richmond, Va., will take bids on a two-story plant, 200 x 300 ft., for the manufacture of wood boxes, etc., to cost about $250,000 with machinery. Carneal & Johnston, Chamber of Commerce Building, are architects.

The Baptist & Goode Co., Boydton, Va., manufacturer of juvenile coasters and vehicles, is planning for the installation of forge shop equipment.

The Crisp County Lumber Co., Cordele, Ga., has tentative plans for rebuilding its plant and power house, partially destroyed by fire, Sept. 4, with loss estimated at $100,000, including machinery.

The Savannah Gas Co., Savannah, Ga., will install additional steam power and other machinery in connection with extensions to cost $500,000. The company has arranged for a stock issue of $1,850,000 and bond issue of $600,000.

A vocational department will be installed in the high school to be erected at Chesterfield, S. C., for which foundations will soon be laid. The Board of Education is in charge.

The Buchanan Locust Pin Co., Buchanan, Va., has awarded a contract to William R. West, Buchanan, for a new plant, 30x70 ft., with extension, 30x50 ft., for the manufacture of insulator pins, brackets, etc., estimated to cost about $35,000, with machinery. L. G. Vaughn is president and C. C. Crouch, general manager.

Bids will be received by the Chief of Air Service, United States Army, Washington, until Sept. 24 for two portable air compressors, circular C. A. S. 24-76; until Sept. 18 for 200 radiator assemblies, circular C. A. S. 24-23.

The Prudential Oil Co., Keyser Building, Baltimore, will build a new storage and distributing plant at Fourth Avenue and Seventh Street, estimated to cost $100,000, with equipment.

The Common Council, Sylvester, Ga., is considering the installation of electrically-operated pumping machinery at the municipal waterworks, to replace present steam-operated equipment.

J. E. McDonald, Cuthbert, Ga., has inquiries out for a stationary engine 50 to 60 hp., with auxiliary equipment, second-hand, in good condition.

The Board of Trustees, Cullowhee Normal and Industrial School, Cullowhee, N. C., is perfecting plans for extensions in the power house at the institution, including the installation of additional equipment, estimated to cost $45,000. H. A. Underwood, Commercial Bank Building, Raleigh, N. C., is engineer.

The Annapolis & Chesapeake Bay Power Co., Annapolis, Md., will issue bonds for $800,000, of which about $200,000 will be used for extensions in power plant and system and the installation of additional equipment.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for a stationary steam engine, 125 to 150 hp., second-hand in good condition; also for a steel oil tank, about 20,000 gal. capacity; and for ten stevedore trucks, pony type.

The Morgart Coal Mining Corporation, Jennings, Md., will install electric power and mechanical equipment at its properties in the northern part of Garrett County, including machinery for the opening of a new mine and the electrification of existing mines. William A. Morgart is president.

Plans are under way for the installation of an ice and cold storage plant at the factory of the Planters Nut & Chocolate Co., Suffolk, Va., in connection with the erection of a five-story addition, estimated to cost $250,000, with machinery.

Electric and steam power equipment, conveying machinery, etc., will be installed in the new plant and power house to be erected by Archer's Laundry, Howard and Mulberry Streets, Baltimore, to cost $500,000, of which $200,000 will be used for equipment.

The Brady Mining Co., McLean, Va., recently organized, is planning for the installation of electric power and other equipment at its copper properties near Brady, Va. A power house will be erected. F. N. Hagman, Vienna, Va., heads the company.

The Tallapoosa River Power & Textile Corporation, Tallapoosa, Ga., recently organized with a capital of $500,000 has tentative plans for the construction of a hydro-electric power plant on the Tallapoosa River, to cost in excess of $150,000. W. W. Summerlin, Camp, Ala., heads the company.

The Tiger Tire & Rubber Corporation, 749 Equitable Building, Baltimore, recently organized, is contemplating the erection of a plant at Havre de Grace, Md., for the manufacture of automobile tires, estimated to cost $150,000 with equipment.

The Chicago Nipple Mfg. Co., First Avenue and Ninth Street, Baltimore, manufacturer of pipe nipples, pipe coils, etc., has acquired an adjoining building which will be remodeled for manufacturing purposes.

Philadelphia

PHILADELPHIA, Sept. 10.

CONTRACT has been awarded by the Edward G. Budd Mfg. Co., Hunting Park Avenue and Wissahickon Street, Philadelphia, manufacturer of steel automobile bodies, to the Wark Co., 1600 Walnut Street, for a six-story addition, 100x325 ft., with one-story extension, 75x325 ft., to cost about $800,000, including machinery.

The Ford Motor Co., Highland Park, Mich., has plans for the erection of its new assembling plant on Sixty-third Street, Philadelphia, for which bids will soon be asked on a general contract. It will be one-story, 400x925 ft., estimated to cost $500,000 with equipment. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Pennsylvania Sugar Co., Delaware Avenue, Philadelphia, has awarded a contract to the O'Meara Construction Co., 228 Warnock Street, for an addition to its refinery, to cost $300,000.

The R. W. Hartnett Co., 1010 Race Street, Philadelphia, manufacturer of printing equipment and supplies, has plans for a new three-story factory, 50x95 ft., to cost $70,000 with equipment.

The Steel Heddle Mfg. Co., Twenty-third Street and Allegheny Avenue, Philadelphia, is taking bids on a general contract for its branch plant at Greenville, S. C., estimated to cost $100,000 with equipment. J. E. Sirrine & Co., Greenville, are architects and engineers in charge.

The plant of the Wright Roller Bearing Co., 2929-55 North Twentieth Street, Philadelphia, on site 201x270 ft., has been acquired by C. B. Mertz, Philadelphia, for $100,000. The new owner is said to be planning to use the property for a similar line of production.

The Berko Brothers Co., Randolph and Wood Streets, Philadelphia, manufacturer of ornamental and other iron work, will commence the erection of a one-story addition, 75x90 ft., at 327 North Randolph Street, estimated to cost $25,000.

The Board of Education, Atlantic City, N. J., is taking bids on a general contract until Sept. 20 for a three-story addition, 42x125 ft., to the vocational and industrial school at Indiana and Baltic Avenues, to cost $160,000. Bertram Ireland, Guarantee Trust Building, is architect.

Manual training equipment will be installed in the two-story and basement junior high school to be erected on West Walnut Street, Shamokin, Pa., estimated to cost $130,000, for which an architect will soon be selected to prepare plans.

The Textile Machine Works, Wyomissing, Pa., has acquired the two foundries of Edwin A. Moore, Fort and Robeson Streets, Reading, Pa., for $85,000 and $35,000, respectively. The new owner plans for extensions.

The Falker Coal Co., Ashland, Pa., has plans for a new mechanical coal washery, to cost in excess of $45,000.

The Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, will install additional machinery at its coal breakers in the Pottsville, Pa., district, including repairs and parts replacements in present equipment.

The Reading Rubber Co., Carsonia Avenue, Reading Pa., is perfecting plans for an addition and improvements to its plant at Fleetwood, Pa., estimated to cost $80,000. Samuel H. Bell is president.

C. A. McClure and C. Schubert, Philadelphia, are organizing the Sandy Creek Township Power Co., Greenfield Township Power Co., and the French Creek Township Power Co., to construct power plants and systems in the respective territories. State charters will be granted on Sept. 24. James C. Jones, Bullitt Building, is representative.

Electric power equipment, conveying machinery, etc., will be installed in the two additions to be erected by the Lemoyne Block & Brick Co., Lemoyne, Pa., estimated to cost $25,000, for which plans have been completed.

Pittsburgh

PITTSBURGH, Sept. 10.

THE machine tool business has been dull the past week. Sales have been entirely of single tools and only in one or two cases have involved large expenditures. The crane market also has had a quiet week in sales and inquiries. Some activity has been observed in car equipment.

The Clarksburg Gas & Electric Co., Clarksburg, W. Va., has placed a 5000-kw. turbine with a 60-kw. motor generator set, for excitation purposes, with the General Electric Co., and a condenser with the C. H. Wheeler Mfg. Co. The Eastern Ohio Mfg. Co., which is equipping a plant at Warren, Ohio, to make cold-rolled strips, has placed the order for the electrical equipment with the General Electric Co., which includes one 750-kw. motor generator set, two 150-hp., four 100-hp., and four 50-hp. variable speed motors, together with the switchboard and control equipment.

Tentative plans are being considered by the Locomotive Stoker Co., 100 General Robinson Street, Pittsburgh, for a new one-story machine shop.

The Ohio River Edison Co., Sharon, Pa., and Toronto, Ohio, has made application for permission to construct an electric generating plant, coal-handling works, ice breakers and harbor terminal on the Ohio River at Toronto, about 55 miles distant, to cost $1,000,000 with machinery.

Manual training equipment will be installed in the proposed two-story high school to be erected at Beckley, W. Va., estimated to cost $250,000, for which an architect will soon be selected.

The Pennsylvania Railroad Co., Central Region, Conemaugh Division, Pittsburgh, George Nauman, 1155 Liberty Avenue, Division Engineer, has tentative plans for a new engine house and repair shops at Sharpsburg, Pa., estimated to cost $100,000. A. C. Shand, Broad Street Station, Philadelphia, is chief engineer.

The Logan Cut-Out Switch Mfg. Co., Logan, W. Va., recently organized with a capital of $100,000 to manufacture patented electric switches, has perfected arrangements with the West Virginia Grinding & Machine Shops, Huntington, to manufacture and assemble its equipment. The new company has tentative plans for the establishment of a plant at Logan at an early date. William Abraham is president.

Manual training equipment will be installed in the high school to be erected at Warren, Pa., for which it is expected to vote an appropriation of $350,000.

The Sterling Oil Products Co., Huntington, W. Va., is perfecting plans for the construction of a new storage and distributing plant on Thirty-first Street, estimated to cost $150,000. G. C. Barnes is general manager.

The Guyan Machine Shops, Logan, W. Va., machinery dealers, have inquiries out for a heavy duty milling machine, electric and steam-operated hoists, portable type, including belt-driven equipment, and for a number of transformers, 10, 15 and 20 kva. capacity, with hangers, fuses, lightning arresters, etc.

The A. C. Love Co., Huntington, W. Va., machinery dealer, has inquiries out for a hydraulic wheel press, about 200 tons capacity. Also, for a toggle press, Bliss type.

The Virginian Power Co., Charleston, W. Va., has acquired property adjoining its electric power plant at Cabin Creek Junction and plans for a new addition for considerable increase in capacity.

Manual training equipment will be installed in the new three-story high school to be erected at Charleston, W. Va., estimated to cost $500,000, for which bids will be asked on a general contract late in Oct. H. R. Warne, Masonic Temple Building, is architect.

Detroit

DETROIT, Sept. 10.

A FIVE-STORY power plant, 110 x 140 ft., to cost about $200,000, will be erected by the Ford Motor Co., Highland Park, Mich., at Iron Mountain, Mich. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Columbia Motor Co., 6501 Mack Avenue, Detroit, has acquired the plant of the Liberty Motor Car Co., Charlevoix Avenue, at a receiver's sale and will use it for expansion.

Work will commence on an addition to the municipal power plant at Detroit, for which bonds for $1,000,000 recently were voted, to include the installation of machinery. The Municipal Power Department is in charge.

Electrically-operated pumping machinery will be installed at the new waterworks plant to be built by the Board of Works, Jackson, Mich., estimated to cost $400,000, for which plans are being prepared by Howd, Decker, Shoecraft & Dryer, 303 South State Street, Ann Arbor, Mich., engineers.

The Castile Mining Co., Ramsay, Mich., will build a new power house, machine shop and other buildings at its new shaft, to cost $400,000 with equipment.

The Auto Specialties Mfg. Co., St. Joseph, Mich., has preliminary plans for additions, including a one-story foundry, core department, hard iron shop and power house. Foundations will be laid at once for the initial structure to be L-shaped, 300 x 300 ft., primarily for the production of malleable iron castings. The expansion, with equipment, is estimated to cost $200,000.

Ogleby, Norton & Co., Hanna Building, Cleveland, operating iron ore properties at Ramsay, Mich., and vicinity, have awarded a general contract to the Foundation Co., 120 Liberty Street, for a one-story machine shop and power house estimated to cost $500,000.

The Arcadian Consolidated Mining Co., Calumet, Mich., is planning the installation of new hoisting machinery, air compressor, two boilers and auxiliary power equipment at its New Baltic properties, replacing the works destroyed by fire last spring.

The Ashton Equipment Co., Watervliet, Mich, manufacturer of metal and wood equipment for postoffice service, which recently arranged for the removal of its plant from Chicago to a local building, is considering plans for a new factory, 50 x 100 ft. The local Chamber of Commerce is interested in the projeect.

Electrically-operated pumping machinery will be installed by the City Council, Winona, Mich., in connection with extensions in the municipal waterworks, for which plans are being prepared by Alvord, Burdick & Howson, 8 South Dearborn Street, Chicago, engineers.

Buffalo

BUFFALO, Sept. 10.

PLANS are being perfected by the Ontario Paper Co., Thorold, Ont., for a new paper mill and power plant on site acquired on Little Island, North Tonawanda, N. Y., estimated to cost $2,000,000 with equipment. Warren Curtis, general manager, is in charge.

A machine shop will be installed in the three-story automobile service building to be erected on Elmwood Avenue, Buffalo, by the Becker-Hoffman Service Co., 250 Franklin Street, to be 50 x 115 ft., estimated to cost $85,000.

The Martin Pulp & Paper Co., Norwood, N. Y., has commenced the erection of a new plant for the manufacture of tissue papers, to cost in excess of $150,000 with machinery.

Manual training equipment will be installed in the new two-story and basement high school at Sherburne, N. Y., estimated to cost $125,000, for which bids are being taken on a general contract. J. Mills Platt, Cutler Building, Rochester, N. Y., is architect.

L. Bergman, city engineer, Jamestown, N. Y., will purchase a boiler, pumping equipment and other machinery, for installation in the proposed addition to the Cassadagua waterworks plant.

The New York Central Railroad Co., 466 Lexington Avenue, New York, has awarded a general contract to the Walsh Construction Co., Herald Building, Syracuse, N. Y., for a new engine terminal and repair shops at Selkirk, N. Y., estimated to cost $100,000.

Fire, Aug. 31, destroyed a portion of the plant of the Hoboken Paper Co., Gould, near Stottville, N. Y., with loss

estimated at $300,000, including machinery. Headquarters of the company are at 51 Newark Avenue, Hoboken, N. J.

C. W. Grinnell, Medina, N. Y., is planning the erection of a new ice and cold storage plant to cost about $60,000, to replace a similar works recently destroyed by fire.

The Garlock Packing Co., Palmyra, N. Y., manufacturer of steam packings, has announced plans of expansion to cost about $350,000. A new warehouse with 40,000 sq. ft. will form part of the additions.

Milwaukee

MILWAUKEE, Sept. 10.

DEFINITE improvement in the demand for agricultural machinery, largely from the cotton belt, has resulted in the material enlargement of working forces in farm equipment shops in this territory. The condition appears as the high light of the situation of foundries and machine shops at the moment. The past week's trade in general was confined largely to scattering purchases of one or a few tools by the automotive industries, with a few going to railroads and others to industrial machine shops. There was no marked increase of volume of sales, but inquiry was increasingly active and much is expected in the way of new business in September.

The J. I. Case Plow Works Co., Racine, Wis., increased its operating force by more than 300 the past week to handle a fair-sized accumulation of orders for planters, cultivators, plows and smaller tools, coming largely from the cotton belt. It was stated that it has been three years since the Case works have had as large bookings of manufacturing specifications as on Sept. 1. Nothing definite as to the trend of demand for machinery and tools in the wheat and corn belts has as yet appeared.

The Oneida Mfg. Co., Green Bay, Wis., incorporated recently with $500,000 capital stock, has completed the acquisition of the entire plant, assets and business of the Oneida Motor Truck Co., Green Bay, and will resume the operation on a moderate scale immediately. In addition to building motor trucks, the new concern will engage in the manufacture of gasoline railroad cars and coaches and miscellaneous power units, metal specialties, etc. L. W. Melcher, who assumed charge of the Oneida works as general manager last spring, is president and general manager of the new organization.

The Board of Education, New London, Wis., has selected Smith, Reynolds & Brandt, architects, Manitowoc, Wis., to design the proposed new $240,000 high and vocational training school. Foundations will be laid this fall.

The Thurner Heat Treating Co., 126 Ferry Street, Milwaukee, which is enlarging its plant, has changed from a partnership to a corporation, retaining the original title. The capital stock is $50,000. Rudolph J. Thurner has been elected president and general manager, and William B. Schroer, works manager.

E. W. Ihrig, of the Pine-Ihrig Mfg. Co., Oshkosh, Wis., has purchased the business and property of the defunct Washkosh Mfg. Co., which manufactured washing machines with manual and power drive, and will consolidate the factory with that of the Pine-Ihrig company, which is a manufacturer of wire spring machines, woodworking equipment and other special machinery. The new owner will need only a few items of miscellaneous tools to supplement the Washkosh equipment.

The Mid-West Automobile Accessories Mfg. Co., Green Bay, Wis., has been organized with $50,000 capital by Ralph W. Davis, A. R. Klug and A. A. Brazeau to establish a plant for the production of a general line of metal parts and specialties. A building has been leased and equipment is being purchased.

Charles Kuehn, Ripon, Wis., sustained an estimated loss of $12,000 when fire on Sept. 1 destroyed his machine shop and ruined most of the equipment. It was a frame structure which will be replaced with a concrete and brick building at once.

The Board of Education, Black River Falls, Wis., is considering tentative sketches for a proposed $75,000 addition to the high school to provide facilities for instruction in manual training and domestic science. The work is to be done in the spring of 1924. A. P. Jones is secretary of the board.

The Riverside Fibre & Paper Co., Appelton, Wis., let the general contract for a $300,000 paper finishing mill, 89 x 250 x 65 ft., one to five stories, to C. R. Meyer & Sons Co., 50 State Street, Oshkosh, Wis. Special paper mill machinery, electric motors, etc., are being purchased. Stephen Murphy is general manager. The engineer is T. W. Orbison & Co., Appleton.

The Janesville Tool Mfg. Co., Janesville, Wis., is making some purchases of tool room equipment from time to time to meet demands for special tools and dies from the typewriter, accounting machine and fine metal goods industries.

Cincinnati

CINCINNATI, Sept. 10.

THE past week was quiet so far as orders were concerned, but inquiries continue regularly and while none is large the character of those received indicates that some business will eventually develop. The principal source of activity is the automobile industry, and some orders for single tools were received from the Detroit district last week. The safe companies at Hamilton, Ohio, also have been consistent buyers for some time. Scattered orders for single tools from railroads are also reported.

It is expected that a demand for machine tools will develop for shipment to Japan following the disastrous earthquake, but export orders at present are negligible. Used machinery is still moving fairly well.

The Baker Car Co., recently incorporated in Kentucky, is having plans prepared for a factory to be erected at Lexington, Ky., in which it is proposed to build mine cars and kindred equipment. J. M., W. G., and J. A. Baker, Harriman, Tenn., are the principal incorporators.

The Eugene Strauss Cabinet Co., Louisville, Ky., has awarded contract for a brick and concrete factory to cost approximately $250,000. It will also erect a number of cottages for housing its employees. The company will manufacture all kinds of cabinets and will install a number of woodworking machines.

The Louisville Petroleum Refining Co., Louisville, Ky., will shortly commence the construction of a refinery to cost $300,000. It will have a daily capacity of 2500 bbl., and will be completed in about six months. W. M. Mitchell is president.

Chicago

CHICAGO, Sept. 10.

DEMAND for machine tools shows little, if any, improvement, although here and there manufacturers of seasonal goods are adding to their equipment. A local company making winter fronts for automobile radiators purchased two punch presses. The Western Electric is placing considerable equipment for its new wire plant, but this is largely special machinery made according to the company's own specifications. Prospects for railroad business this fall are not particularly bright because some of the roads are finding it necessary to economize, owing to diminishing returns. The Chicago, Indianapolis & Louisville, however, has put out an inquiry for woodworking machinery, and the Chicago, Burlington & Quincy is in the market for a 10-ft. 14-gage hand cornice brake. The latter road is also expected to close against its list of long standing, although no definite word has been given out as to just when such action will be taken.

Following is the Chicago, Indianapolis & Louisville list of woodworking machinery:

One cut-off saw to cut material 10 in. square.
One rip-saw to handle material 8 in. thick x 16 in. wide.
One No. 3 hand saw.
One double cylinder planer to handle 12-in. material.
One combination automatic car gainer.
One vertical and horizontal chisel mortiser with vertical car borer attached, having traveling carriage 40 ft. long.

The D. O. James Mfg. Co., manufacturer of cut gears, 1120 West Monroe Street, Chicago, has placed contract for a three-story factory, 48 x 50 ft., to cost $50,000. This will constitute the third unit of the company's new plant.

The National Lock Co., Rockford, Ill., will erect a one-story factory, 100 x 151 ft., to cost $25,000.

William Gaertner & Co., manufacturers of scientific instruments, 5343-9 Lake Park Avenue, Chicago, have sold their plant and are constructing a new factory to cost

$150,000 on a 150 x 150-ft. site at Wrightwood and Racine Avenues.

The York Mfg. Co., manufacturer of ice-making and refrigerating machines, 1509 North Halsted Street, Chicago, has let contract for a one-story addition, 38 x 50 ft., to cost $20,000.

The Chicago Window & Door Screen Co., 5118 South State Street, Chicago, has let contract for a two-story factory, 57 x 112 ft., at 5322-26 South State Street, to cost $15,000.

The Chicago Motor Coach Co., 1124 Rosemont Avenue, Chicago, has awarded contract for a one-story garage, 259 x 260 ft., at 4533-55 Wilcox Street, to cost $200,000.

The Bankers Supply Co., 5950 South State Street, Chicago, has let contract for a two-story printing plant, 80 x 116 ft., at 38-44 West Sixtieth Street, to cost $45,000.

The Seng Co., manufacturer of hardware, 1440-46 Dayton Street, Chicago, has awarded contract for two additional stories, 87 x 183 ft., to its factory, to cost $50,000.

W. H. Hutchinson & Son, manufacturers of bottlers' supplies, 2101 Walnut Street, Chicago, are having plans prepared for a two-story factory, 50 x 125 ft., at the northwest corner Hoyne Avenue and Lake Street, to cost $45,000.

The Hays Brass & Aluminum Foundry Co., recently incorporated with $50,000 capital stock at Michigan City, Ind., will operate two plants, one at Michigan City and one at LaPorte.

The Electric Auto Lite Co., Adrian, Mich., is fitting up an additional floor in its factory which will double its capacity. The Adrian plant is used for winding armatures for starting and lighting systems of automobiles and it is planned to increase the daily production of 800 wound armatures to 1500 or 2000.

The Rose Machine Works, Lincoln, Neb., contemplates the purchase of a milling machine and an engine lathe.

Fairbanks-Morse & Co., Chicago, have purchased all except one-and-a half acres of the former County workhouse property at Indianapolis, Ind., and contemplate erecting new factory buildings to adjoin their present plant at Indianapolis, which covers four and one-half acres.

Manufacturing operations have been started at the plant of the Tri-City Malleable Casting Co., East Moline, Ill., a new organization.

The Woods-Everetz Stove Co., Springfield, Mo., has started construction of an addition for the manufacture of enameled ware on gas ranges and other stoves to cost $3,500. It is also repairing a building formerly belonging to the Springfield Machinery Co., purchased last year, which will be used for an enlarged nickel plating department.

J. L. Davis, Jr. and M. E. Peace have purchased the machine shop of Thomas Morton, Magnolia, Ark., which they plan to rebuild.

The Marks-Fiske-Zeiger Co., 2503 Twenty-fourth Street, Detroit, is in the market for 300 tons of 80-lb., No. 1 relaying rails, A.S.C.E. quality, and angle bars to match.

Plans are in progress for the construction of a new power house at the State Teachers' College, Macomb, Ill., to cost $125,000. The Department of Public Works and Buildings, Springfield, Ill., is in charge. E. A. Martin, 304 South Wabash Avenue, Chicago, is State architect.

Bids will be received by the Bureau of Reclamation, United States Government, Denver, Colo., until Oct. 3, for hoisting machinery, gates and miscellaneous metal work for the Boise project, Idaho, and the Riverton project, Wyoming.

The Metropolitan Utilities Co., Omaha, Neb., will build a one and one-half story and basement addition to its electrically-operated pumping plant at Twenty-eighth Avenue and Hunt Street, and will install additional equipment.

The Mulvey Iron Works, 1840 Carroll Avenue, Chicago, is having preliminary plans drawn for a new one-story steel fabricating plant. G. J. Helbach, 415 South Dearborn Street, is engineer.

A machine shop will be installed in the two-story and basement automobile service building, 50 x 125 ft., to be erected by the Belsky Motor Co., Iowa and Sixth Streets, Dubuque, Iowa, to cost $60,000. Koenigsberg & Weisfeld, 5 North La Salle Street, Chicago, are architects.

The Chicago Metal Mfg. Co., 3724 South Rockwell Street, Chicago, is planning for the installation of sheet-metal working machinery, including shears, punches, etc.

The Common Council, Washington, Iowa, is planning for the installation of electrically-operated pumping machinery, switchboard and auxiliary equipment in connection with extensions and improvements in the municipal waterworks, estimated to cost $80,000. A. L. Mullergren, Gates Building, Kansas City, Mo., is engineer.

The Domestic and Foreign Commerce Department, Chicago Association of Commerce, 10 South La Salle Street, has received an inquiry (No. 2358) from a company at Tehuacan, Pueblo, Mex., in the market for American machinery for the manufacture of fiber rope and kindred products.

The Republic Flow Meters Co., 2240 Diversey Parkway, Chicago, manufacturer of steam meters, etc., will take bids for a two-story and basement addition to cost $30,000. The L. G. Hallberg Co., 116 South Michigan Avenue, is architect.

The Arpinus Mfg. Co., 2601 Cottage Grove Avenue, Chicago, manufacturer of metal and tin specialties, is planning for the installation of a 36-in. shear.

The Central Power Co., Omaha, Neb., has construction in progress on a new steam-operated electric generating plant on the Platte River, near Grand Island, Neb., estimated to cost $750,000, with turbo-generators and auxiliary machinery.

Manual training equipment will be installed in the new high school to be erected at Williamsfield, Ill., estimated to cost $90,000, for which an architect will soon be selected.

Cleveland

CLEVELAND, Sept. 10.

ORDERS and inquiries for machine tools show improvement and indications are that September business will be considerably larger than that in August. While no lists of any size have come out, machine tool manufacturers are getting a good volume of inquiries for small lots and single machines. Bids were opened Sept. 4 for considerable equipment for the Roosevelt High School, Dayton, Ohio. The equipment of the Elyria Machine Co., Elyria, Ohio, will be sold at auction Sept. 13 and includes 65 machines of various types.

There is some speculation among machinery men as to the demand for machine tools which will come from Japan to replace equipment destroyed by the earthquake.

The largest order reported is for 17 machines placed by the Eaton Axle & Spring Co., all of which went to a Cleveland dealer. It included two presses, 13 polishing lathes and 2 grinders for the Cox automobile bumper plant, which was recently purchased by the Eaton company, and two automatic disk grinders for the spring plant. The Ford Motor Co. purchased 12 large turret lathes from a Cleveland manufacturer. Other orders include two large turret lathes and two or three screw machines for the Westinghouse Air Brake Co., two turret lathes for the Central Railroad of New Jersey, one turret lathe for the Elgin, Joliet & Eastern Railroad, and nine hand screw machines for the William Powell Co., Cincinnati. One foreign order for a turret lathe came from France, which is the first export order received by a Cleveland company for some time. This manufacturer reports that its August orders increased 100 per cent over July.

The Central South

ST. LOUIS, Sept. 10.

PLANS are being arranged by the St. Joseph Railway, Light & Power Co., St. Joseph, Mo., for a new electric generating plant to cost $1,000,000 with machinery.

The Acme Mfg. Co., Marion, Mich., has leased the Overland Building, Wall and Second Streets, Joplin, Mo., for the establishment of a branch plant to manufacture refrigerators, automatic vending machines, metal cans, etc.

The Michael & Ferguson Hardware Co., Paducah, Ky., has authorized plans for a four-story and basement factory, 115x150 ft., to cost $150,000 including equipment. D. Harry Jamieson, 438 South Second Street, is architect; M. Michael is president.

The National Convertible Body Co., 309 Union National Bank Building, Knoxville, Tenn., B. D. Hammond, president, is perfecting plans for the establishment of a new works for an initial output of about twenty bodies per day.

The Crystal Ice & Fuel Co., Wichita, Kan., will build a one-story addition to its power house, for which plans are being drawn by Eberson & Weaver, 514 Orpheum Building, architects.

Bids will be received by the Board of Supervisors, Foley, Mo., until Sept. 15 for equipment for a local pumping plant, including one 45 hp. oil-operated engine, vertical or horizontal; one centrifugal pump, 7500 gal. per min. capacity; one oil storage tank, and auxiliary equipment. T. N. Jacobs, 1900 Railway Exchange Building, St. Louis, is in charge.

A machine shop will be installed in the four-story automobile service building to be erected at Twenty-seventh and Main Streets, Kansas City, Mo., by the Studebaker-Riley

Co., Twenty-first Street and Grand Avenue, estimated to cost $250,000. Nelson Riley is president.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, is in the market for a number of used industrial trucks, suitable for logging or lumber service; also, for ten sets of wheels and axles for lumber trucks, to be used on iron rails, 30 in. gauge.

The Kentucky-Tennessee Light & Power Co., Hopkinsville, Ky., will commence the construction of a new steam-operated electric power plant, with 3000 kw. turbo-generator, boilers, stokers and auxiliary equipment, estimated to cost $300,000.

The Paris Gas & Electric Co., Paris, Ky., is planning to rebuild the portion of its electric power plant recently destroyed by fire. Additional equipment will be installed.

The Common Council, Goff, Kan., plans for the installation of electrically-operated pumping machinery in connection with a new waterworks system. The Shockley Engineering Co., Graphic Arts Building, Kansas City, Mo., is engineer.

The R. M. Denhard Co., Bardstown Road and Eastview Lane, Louisville, is planning for the establishment of a new machine shop for automobile parts and repairs to replace the works recently destroyed by fire.

The Common Council, Winfield, Kan., will install electrically-operated pumping machinery and other equipment in connection with extensions and improvements in the municipal waterworks, estimated to cost $110,000. H. P. Haynes, Winfield, is engineer.

Chester Davis, Colcord Building, Oklahoma City, Okla., has plans for the erection of a one-story machine shop, 48x100 ft., at 1111 West Main Street.

Manual training equipment will be installed in the new three-story high school to be erected at Dexter, Mo., estimated to cost $95,000, for which bids will be received on a general contract until Sept. 29. H. H. Hohenschild, Odd Fellows Building, St. Louis, is architect.

The Natural Rock Asphalt Co., Brownsville, Ky., recently formed with a capital of $350,000, fully paid, has tentative plans for the construction of a power house in connection with a new plant in Edmonson County, estimated to cost $150,000. C. K. Kirkpatrick is president.

The Gulf States

JACKSONVILLE, Sept. 10.

WORK will commence on rebuilding the portion of the plants of the Dallas Brass Mfg. Co., and the Motor Products Corporation, 2810-12 Elm Street, Dallas, Tex., affiliated organizations, destroyed by fire, Aug. 27, with loss estimated at $30,000. J. Watt Davis is president of both companies.

The Whiting Railway Motor Car Co., Tampa, Fla., has tentative plans for the establishment of new works to manufacture railroad passenger cars, operated by gasoline motors, estimated to cost $90,000. F. W. Brown and J. A. Whiting, both of Tampa, head the company.

The Oldsmar Automotive Accessory Corporation, Oldsmar, Fla., recently organized, has acquired the machine shop and foundry of the Oldsmar Mfg. Co., and will remodel the works to manufacture a line of automobile equipment.

The Mack International Motor Truck Corporation, 25 Broadway, New York, has plans for the erection of a new factory branch at Hickory and Ervay Streets, Dallas, Tex., 110x150 ft. C. E. Craddock, State manager, will be in charge.

Manual training equipment will be installed in the new three-story high school to be erected at Nederland, Tex., estimated to cost $100,000, for which bids have been called on a general contract. E. O. Taylor, 1802 Orange Street, Beaumont, Tex., is architect.

The Common Council, Ennis, Tex., plans the installation of electrically-operated pumping machinery in connection with extensions and improvements in the municipal waterworks, estimated to cost $50,000.

The J. R. Littlepage Drilling Co., Monroe, La., is planning to purchase portable oil-well drilling machinery, steam and gas-operated. J. R. Littlepage is president.

Fire, Aug. 31, destroyed a portion of the plant of the Orient Oil Refining Co., Wichita Falls, Tex., with loss estimated at $125,000 including equipment. It will be rebuilt.

The Burns Construction Co., Sarasota, Fla., has preliminary plans for new works to manufacture cement blocks, tile and similar products, estimated to cost $50,000 including machinery. T. R. Martin, Sarasota, is architect. Owen Burns is president.

The Common Council, Mercedes, Tex., is arranging for a special election to vote bonds for $150,000, the proceeds to be used for the installation of a municipal electric power plant and electrically-operated waterworks system.

The Magnolia Petroleum Co., Dallas, Tex., has arranged for the construction of a new oil refinery in the Luling Field, near Beaumont, Tex., with an initial capacity of 6000 bbl. per day.

The Sinclair Refining Co., Houston, Tex., will make extensions and improvements in its local oil refinery and distributing plant on the Houston Ship Channel, to cost in excess of $5,000,000, including the installation of additional machinery.

The Vulcan Rivet Corporation, Box 302, Birmingham, is in the market for a bar shear, capacity, 2-in. round bar; one six-spindle power feed drill, capacity 5-8 in., each spindle operated separately.

Indiana

INDIANAPOLIS, Sept. 10.

PLANS are being drawn for a one-story addition, 120 x 210 ft., to the plant of the Super-Heater Co., Railroad Avenue and 151st Street, East Chicago, Ind., estimated to cost $75,000.

Bids will be received by the Board of Public Works, City Hall, South Bend, Ind., until Sept. 19 for equipment for the new waterworks plant, including two Corliss pumping engines, each with capacity of 5,000,000 gal. per day, and auxiliary pumping plant machinery; two 150 hp. watertube boilers, with superheaters, and miscellaneous boiler house equipment; coal and ash-handling machinery. J. W. Toyne, South Bend, is engineer in charge.

Manual training equipment will be installed in the proposed new junior high school to be erected at Todd Park, East Chicago, Ind., estimated to cost $400,000. K. D. Norris, Calumet Building, is architect.

The Aladdin Lamp Co., Muncie, Ind., is considering plans for rebuilding the portion of its factory destroyed by fire Sept. 5 with loss estimated at $20,000, of which the greater part represents machinery.

A two-story power plant, 50 x 60 ft., will be constructed by the Excelsior Laundry Co., 222 North Alabama Street, Indianapolis, at its new laundry works, to cost approximately $300,000 with machinery. Blaine H. Miller is president.

Plans are being arranged by the New York, Chicago & St. Louis Railroad Co., Cleveland, (Nickel Plate System), for extensions in its locomotive shops at Frankfort, Ind., including a new engine house, repair shop and other buildings, estimated to cost $300,000, with equipment.

The Pacific Coast

SAN FRANCISCO, Sept. 5.

ERECTION will commence on two one-story additions to the plant of the California Metal Enameling Co., East Fifty-first Street, Vernon, 50 x 120 ft., and 60 x 75 ft., respectively, for which plans have been prepared by Hamm & Grant, Inc., 607 Ferguson Building, Los Angeles, engineers.

The Pacific Motor Products Co., San Francisco, manufacturer of bearings and other automotive equipment, has negotiations in progress for the purchase of a site at San Leandro, Cal., for the erection of a new plant. The local Chamber of Commerce, U. S. Ackles, secretary, is interested in the project. Charles Helser heads the company.

The Southern Pacific Railroad Co., 65 Market Street, San Francisco, has arranged an appropriation for extensions in its car and locomotive shops. The work includes the construction of a new one-story freight car repair shop and wheel shop at Brooklyn, Ore.; addition to steel foundry at the Sacramento shops, to cost $30,000, with a new woodworking plant and planing mill to cost $210,000 with machinery, and acetylene generating plant, $50,000; additional equipment at the Bayshore shops to cost $40,000; a new locomotive erecting shop and addition to machine shop at Los Angeles to cost $600,000 with machinery, and construction of a new power plant at the San Luis Obispo, Cal., shops to cost $50,000.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, will lay foundations for the construction of a new steam-operated electric power plant on Stevenson Street to cost approximately $250,000, including equipment.

The Southern Arizona Power Co., Nogales, Ariz., is disposing of a bond issue of $675,000, a portion of the proceeds to be used for extensions and improvements in electric power and ice-manufacturing plants.

Fire, Aug. 29, destroyed a portion of the plant of the Pacific Enamel & Mfg. Co., Oakland, Cal., with loss esti-

mated at $25,000 including equipment. It is planned to rebuild.

The Common Council, Tacoma, Wash., has authorized plans for extensions in the municipal power plant to cost $58,000.

The Columbia River Paper Mill Co., Vancouver, Wash., has arranged an appropriation of $1,500,000 for the construction of a new paper and pulp mill. F. W. Leadbetter is head.

The Wesco Blower & Pipe Co., Houston, Tex., C. L. Campbell, president, has leased property on East Fourteenth Street, Oakland, for the establishment of a new plant to manufacture exhaust fans, blowers, etc.

The Doble Steam Motors Corporation, San Francisco, has commenced super-structure work at its new plant at Emeryville, Cal., to manufacture steam-driven automobiles. It will cost in excess of $500,000 with equipment.

A manual training department will be installed in the new high school to be erected at Dallas, Ore., estimated to cost $90,000, for which plans are being prepared by Freeman & Struble, Salem, Ore., architects.

Canada

TORONTO, Sept. 10.

MACHINE-TOOL buying in small units continues to feature demand and dealers report a steady flow of orders for single machines. While large lists are absent, buyers are continually entering the market for tools and equipment for replacement purposes and inquiries are making their appearance more frequently than formerly. During the past two weeks Canadian railroads have been making substantial purchases of machinery and tools, and the automotive trades are also buying equipment in good volume. Demand for electrical equipment and mining machinery is also steadily increasing. While the call for new machinery and tools has been showing improvement, dealers state that rebuilt and second-hand equipment has shown even better strides and sales have been mounting.

The Red Star Refinery Co., Ltd., Montreal East, is in the market for oil filtering equipment.

Dick & Carew, Peterborough, Ont., are interested in equipment for a planing mill and box factory.

The Montreal Welding Co., 563 St. Timothee Street, Montreal, is in the market for equipment.

The Montreal Blue Print Co., 209 Beaver Hall Hill, Montreal, is asking for blue printing equipment.

The Canadian Westinghouse Co., Hamilton, Ont., is receiving bids for the erection of a foundry and will purchase equipment.

The Hydro Electric Commission, King Street East, Hamilton, Ont., is having plans prepared for the construction of sub-station and is in the market for transformers, switches, lightning arrestors, bus bars, insulators and wire. B. H. Prack, 1 Main Street, Hamilton, is engineer.

F. Barber, 45 Jarvis Street, Toronto, is preparing plans for the erection of an ice arena, 85 x 185 ft., for the Niagara Falls Arena Co., Ltd., Niagara Falls, Ont., to cost $150,000. The owners are in the market for an artificial ice plant.

Plans are being prepared for a waterworks plant to be built at Creemore, Ont., including mains, hydrants, valves, 3-stage electric pumps, etc. to cost about $40,000. James, Proctor & Redfern, 36 Toronto Street, Toronto, are architects.

The City Council, Three Rivers, Que., is contemplating the purchase of a steel foundry. It is the intention to make alterations in the plant and install machinery for the manufacture of electric steel products.

The Canada Axe & Harvest Tool Mfg. Co., Ltd., St. Patrick Street, Montreal, has let the general contract to James Shearer & Co., Ltd., for the erection of a factory.

The Brampton Tire & Rubber Co., Brampton, Ont., is in the market for equipment for a new $150,000 plant.

Work has been started on a $50,000 addition to the plant of the Pendrith Machinery Co., 970 Queen Street West, Toronto, manufacturer of bakers' and confectioners' equipment. The Dowling Construction Co., Yonge Street, Toronto, has the general contract.

The Canadian Roofing Co., Windsor, Ont., whose plant was recently destroyed by fire with a loss of about $60,000, is making arrangements for rebuilding and is interested in equipment.

STEEL AND INDUSTRIAL STOCKS

Slight Decline Occasioned by the First News from Japan Is Soon Recovered

In the face of the Japanese disaster steel and industrial stocks were but little disturbed. There was a slight drop at the opening, but this was soon recovered. Interests sponsoring independent steels still evince a hopefulness that higher levels can be brought about.

The range of active iron and industrial stocks from Monday of last week to Monday of this week was as follows:—

	High	Low		High	Low
Allis-Chalmers ..	43	44½	Int. Har. pf.....	106¼	107½
Allis-Chal. pf....	92	92	Lima Loco.	64⅞	67⅞
Am. B. S. & Fdy.	70	72	Midvale Steel ...	27⅝	28⅜
Am. Can	95	100⅛	Nat. En. & Stm..	62½	64⅝
Am. Can pf.....	106	107⅞	N. Y. Air Brake.	33¾	34½
Am. Car & Fdy..	162½	164⅞	Otis Steel	8⅞	9⅜
Am. Loco.	72¼	75⅛	Pittsb'gh Stl. pf.	94¾	94¾
Am. Radiator ..	81¾	83¾	Pressed Stl. Car	55½	56½
Am. Roll. Mill pf.	98	98	Replogle Steel ..	12	14¼
Am. Stl. Fdries..	35⅞	37⅛	Republic	46½	51
Am. Stl. Fd. pf..	100	100	Republic pf. ...	92⅝	94⅜
Bald. Loco.	122	125⅝	Reynolds Spring.	19⅞	22⅜
Beth. Steel	51⅛	55¼	Sloss	48	49½
Beth. cum. pf...	94	94½	Steel of Canada	99¼	99¼
Chic. Pneu. Tool.	82	84½	Superior Steel ..	28¼	30
Colo. Fuel	29½	31	Un. Alloy Steel..	32	32
Crucible Steel ..	65	68⅜	U. S. Pipe.....	27½	31¼
Crucible Stl. pf..	89⅞	90¼	U. S. Pipe pf....	73	74½
Deere pf.	61	61	U. S. Steel.....	91⅝	93¾
Gen. Electric ...172		180	U. S. Steel pf...116½		117
Gt. No. Ore Cert.	29¾	30⅞	Vanadium Steel.	31⅝	34½
Gulf States Steel	84	90⅝	W'house Air Br.	81	82
Int. Har.	72⅝	77½	Y'gstown S. & T.	68	70½

Industrial Finances

The Arcade Malleable Iron Co., Worcester and Springfield, Mass., is to reincorporate under Massachusetts laws, with an authorized capitalization of $550,000 7 per cent first mortgage sinking fund bonds, $500,000 8 per cent cumulative preferred stock, and 10,000 shares of common stock having no par value. The company last week made a public offering of the preferred shares. H. P. Blumenauer, general manager of the old company, will be president as well as general manager of the new concern. He, together with the following, constitute the board of directors: John M. Collins, vice-president Moore Drop Forging Co., Springfield, Mass.; J. Verner Critchley, president Reed-Prentice Co., machine tools and president Walden-Worcester, Inc., wrenches, Worcester; Frank A. Drury, president Merchants National Bank, Worcester; Bowen Tufts, vice-president C. D. Parker & Co., Boston, bankers; Frank J. Weschler, president Hendee Mfg. Co., Springfield, motorcycles; and Arnold Whittaker, vice-president Massachusetts Trust Co., Boston. The backers of the original company have relinquished their active interest.

The Great Lakes Engineering Works, Detroit and River Rouge, Mich., and Ashtabula, Ohio, has sold to bankers, who in turn have resold to investors, $1,000,000 8 per cent cumulative preferred stock. Proceeds from the sale of these securities are to be used in retiring the present bonded indebtedness of $1,050,000, leaving all real estate and plants free and clear of liens.

John F. Lucey, president Lucey Mfg. Corporation, 233 Broadway, New York, manufacturer of oil well machinery, has made public an open letter addressed to holders of the corporation sinking fund notes and class A stocks, wherein he invites "a detailed investigation by representatives of the creditors, stockholders and noteholders as to the reason which made impossible an agreement with the banking firms." Disagreement arose over a plan of reorganization suggested by the banks, one of the firms holding out for conditions which Mr. Lucey deemed "unreasonable and improper."

The Hayes Wheel Co. reports gross sales for the first eight months of 1923 in excess of $13,100,000, and net earnings at $1,200,000. This compares with sales of $12,967,000 and profits of $1,346,000 for the full year 1922. Production schedules based on orders in hand indicate that this earning rate will obtain throughout the year.

Homestead Valve Mfg. Co. Absorbs Protected Seat Valve Co.

The Homestead Valve Mfg. Co., Homestead, Pa., manufacturer of the Homestead Quarter-turn Valve, announces that a consolidation has been effected with the Protected Seat Valve Co., Pittsburgh, which has been manufacturing the B & O Protected Seat Globe valve and the Protected Seat hydraulic operating valve; also a full line of check valves and angle valves with the protected seat feature. This line, which will carry the name of Homestead will now be made at the plant of the Homestead Valve Mfg. Co., and marketed along with the other products of the company.

Industrial News Item

By a plan of reorganization the Iron Products Corporation and subsidiaries will be merged into the Universal Pipe & Radiator Co., with capital of 90,000 shares of 7 per cent preferred stock of $100 par value and 100,000 shares of common stock, no par value. Iron Products Corporation subsidiaries include the Central Foundry Co., Central Iron & Coal Co., Central Radiator Co., Essex Foundry, Molby Boiler Co., Chattanooga Iron & Coal Co. and Central Foundry Co., of New Jersey.

Plans of New Companies

The Valley Rolling Mills, Inc., organized with capital stock of $750,000, has completed construction on a rolling mill situated at Elmira, N. Y. It is expected that operation will begin soon. The incorporators are V. A. Roberts, L. A. Anderson and M. K. Sessler. A detailed account will appear in a later issue.

The Clark Cement Brick & Block Co., New York, has been organized with capital stock of $150,000, and will engage in manufacturing cement bricks and blocks for construction purposes. It has an equipped plant at Jones' Point, N. Y., and will be operative shortly. J. M. Clark heads the company. Address care of L. E. Felix, 217 Broadway, N. Y.

Max Weiss & Sons, Inc., 18 Warren Street, New York, recently incorporated with capital stock of $65,000, has a plant in the Middle West engaged in manufacturing enamel ware and hospital accessories.

The Margach Mfg. Co., 213 Centre Street, New York, has been incorporated with capital stock of $100,000 to manufacture typesetting machines and parts. It has a completely equipped shop now turning out replacement parts for printing houses. H. Diamond, L. Krauss and L. Walsh are the incorporators.

The Helmerair Conditioning Corporation, 103 Park Avenue, New York, has been organized with capital stock of $50,000 to manufacture air cooling and conditioning systems for industrial use, succeeding the Lynn Air Conditioning Co. L. Helmer, F. Wells and A. J. Edwards are the incorporators. The company's plant is equipped and in operation.

The Johnson Equalizer Corporation, 505 Fifth Avenue, New York, has been incorporated with capital of $200,000 to manufacture the Johnson spring equalizer, a kind of shock absorber. Manufacturing will be done by contract, arrangements for immediate needs having already been made. L. W. Johnson is president; F. S. Cornell, vice-president, and T. G. Converse, secretary-treasurer.

The Atlas Steel Works, Inc., 623 Pearl Street, Camden, N. J., recently incorporated with capital stock of $125,000 to manufacture steel products, has taken over the business of the Atlas Erecting & Mfg. Co. It has a well-equipped plant and is ready to execute orders for structural steel, ornamental iron, and like products. The company intends to enlarge the plant in the near future. Paul R. Snader is managing director.

The Mava Engineering Corporation, New York, incorporated with capital stock of $20,000, proposes to manufacture airplanes and engines, but will not consider plans for operation for about four weeks. M. P. Paley and J. N. Kuh, are the incorporators. D. O. Kuh, 152 West Forty-second Street, New York, is representative.

The Essex Wire Cloth Co., New York, has been organized with $100,000 capital stock and will manufacture wire cloth and other metal products. The company is yet in the formative stage and will not take up manufacturing details for about six weeks. W. H. Bounce, A. Miller and H. B. Bunecke are the incorporators. C. D. Rogers, 36 West Forty-fourth Street, New York, is representative.

The Bowen-Dumars Power Corporation, New York, incorporated with 1000 shares of no par value stock, is developing power machinery of special design, having a shop and facilities for this stage of the work. Later on the company purposes to manufacture. W. S. Bowen and J. E. Dumars are the principals. Address care of R. S. Nichols, 141 Broadway.

The Non-Tenna Radio Co., New York, has been organized with capital stock of $25,000 to manufacture wireless instruments and equipment. It is likely that the company will manufacture after a time and when it does, work will be let by contract. J. H. and M. F. Weatherlow, and H. Brand are the incorporators. William Rasquin, Jr., 305 Broadway, is representative.

J. B. Hauer, Inc., 100 Bayard Street, Brooklyn, has been incorporated with capital stock of $100,000 to manufacture machinery and operate a general machine works, having purchased a plant on Bridge Street, 250 ft. x 200 ft. Equipment will be installed and the management, which has done work of this nature for 12 years, will follow established lines. J. M. and M. M. Hauer are the principals.

The C-V Products Corporation, New York, incorporated with capital stock of $25,000, has obtained a shop and equipment at 359 Pearl Street, where it will manufacture mechanical devices on a small scale. Eugene Seavy heads the company.

The Chausse Mfg. Co., 206 Lincoln Building, Detroit, has been organized as a subsidiary of the Chausse Oil Burner Co., to manufacture oil-burning and other equipment. The new company has a plant at Goshen, Ind., where it will manufacture asphalt machinery, industrial burners and street car and domestic furnace burners. W. P. White is secretary.

The Tallapoosa River Power & Textile Corporation, Tallapoosa, Ga., capitalized at $500,000, is being organized by W. W. Summerlin of Camp, Ala., and associates to develop hydroelectric power and operate textile mills at Camp. Considerable time will be consumed in organization.

The Modern-Bond Corporation, Wilmington, Del., successor to the Bond Machine Co. and the Modern Machinery Co., has been organized under Delaware laws with capital stock of $1,500,000, to manufacture collapsible tubing. A new plant will be built at Elsmere, Del., but no new equipment will be needed. Products include drill press and heavy machine vises; reloading tools, bullet molds and other ordnance machinery; bottlers' machinery, jigs and lathes. Richard W. Bond, S. C. Bond and J. P. Cann are the incorporators.

The Seaford Metal Products Co., Seaford, Del., recently organized, is ready to begin manufacturing ash separators and is in the market for ash cans to fit them. It is also in need of metal ceiling, metal lath and cornice, and desires to act as manufacturers' representative in these lines. Frederick J. Bauer is president-manager.

The Keystone Cement Block Co., Inc., New York, has been organized to manufacture building material. Part of the work will be done by contract and part in the plant of the company by the same name, whose properties were acquired. Louis F. Perl, 200 Fifth Avenue, is corporate representative.

The Industrial Cotton Oil Co., Waco, Tex., has been organized with capital stock of $150,000 to operate an oil mill plant, purchased from the American Cotton Oil Co., Waco. No additional equipment will be needed for a time. J. M. Ford is manager.

The Carloyd Electric & Radio Co., Newark, N. J., has been organized to manufacture radio receiving sets and transmitters. Upon completion of organization matters, which will take a few weeks, plans for manufacturing will be considered. Address care of L. E. Gehman, 390 South Eleventh Street, Newark.

The Geo. A. Hebb Spring Works, Murray and Austin Streets, Newark, N. J., has been incorporated with capital stock of $100,000 to manufacture springs for automatic machines, having acquired a private business in this line. Besides making springs the company expects to do general machine work in its plant at Newark. L. E. Hebb heads the company.

The Speeddee Specialty Co., care of H. Levin, 15 Park Row, New York, has been organized to acquire an established business in manufacturing radio parts.

Receiver for Harrisburg Foundry & Machine Co.

Christian W. Lynch, of Harrisburg, Pa., has been named by Dauphin County courts as receiver of the Harrisburg Foundry & Machine Co., Harrisburg, Pa., on petition of three creditors, who charge that the firm is insolvent and operating at loss because of mismanagement.

Just prior to the naming of the receiver, Alfred J. Sohland, of Harrisburg, resigned as president of the firm and of the Harrisburg Corporation, which controls a majority of the Harrisburg Foundry & Machine Co. stock. Creditors filing the receivership petition were Henry Gilbert & Son, of Harrisburg, and the Eugene Dietzgen Co. and the Pennsylvania Bronze Foundry Co., Philadelphia. The petition estimated the firm's assets at $700,000 and the liabilities at $943,000, including $500,000 in outstanding capital stock.

The Harrisburg Foundry & Machine Co. has been in continuous operation for 65 years. In 1920 the Harrisburg Corporation was organized for the purpose of taking over control of the company, which then had quick assets of $200,000 and only $9,000 indebtedness. According to the petition the company's surplus has since been dissipated and its indebtedness increased to $943,000.

The receivership has been made temporary for 30 days, during which time the plant will continue in operation under the direction of Mr. Lynch, a former general manager of the organization.

Steel Foundries and Cooperative Research

(*Concluded from page 675*)

probably be castings that actually cost $150 per ton to produce, and others that cost $1,000 per ton to produce.

The steel foundry industry is in a position not unlike that of other industries with regard to cost accounting and the use of cost data as means of control. There are perhaps at the present time a number of foundrymen who pay little or no attention to costs, but merely try to conduct their business by chance and by the figures shown on the general financial statement of profit or loss. Since this subject of costs is such a vital one in modern management and particularly in plants producing diversified articles such as ordinarily made in jobbing shops, it was one of the first to be given thorough consideration by the Electric Steel Founders' Research Group. This statement should not be construed to mean that the companies in the group did not have cost accounting systems previous to that time, but that they possessed the desire to improve existing methods.

The members of the group realized the need for a standard classification of accounts and definitions of accounts to be used at each plant, in order that manufacturing costs could be compared intelligently. When conducting research investigations which are primarily for the purpose of improving the quality of the product and of decreasing production costs, it is obvious that there must be suitable means for determining the effect of these on costs. Considerable time was devoted to formulating and adopting a uniform classification of cost accounts, and of course while doing this, due regard was given to cost accounting principles. This was a gradual development and at the present time it is at a point where exactly the same items of expense are charged to the same cost accounts at each plant.

At the present time, the group is making a thorough study of the problem of distribution of indirect expense or burden, so that it will be equitably applied when determining the cost of specific castings.

To derive the greatest benefits from cooperative work in the way of decreasing manufacturing costs and eliminating waste, it is desirable to compare costs of the various operations at each of the plants. Of course, comparisons of costs can be made intelligently only when the nature of the work done by such plants is similar and when the same cost accounting methods are used. This happens to be the condition at the plants in the research group, where similar organizations, equipment, manufacturing processes, and cost accounting methods, are used. Manufacturing cost comparisons among the five companies have created a great deal of interest in the subject of costs at each of the plants.

The benefits obtained from comparing the costs of the various operations in one plant with those in other plants, are hardly susceptable to accurate meaurement. However, it is reasonable to suppose that such benefits do occur. For example, if a plant perceives that a certain operation at that plant has a greater cost than the some operation at another plant, it has a definite goal to aim at. When such conditions occur, there is a free and unbiased exchange of practice and opinions among the members of the group, thereby enabling one plant to ascertain precisely the conditions at the other plants. Without this kind of cooperation, a company would have no knowledge concerning the possibility of changing its methods to reduce costs of operations.

Cooperation in Merchandising

Beneficial results are being obtained from cooperation among the foundries in the research group, along merchandising lines. By this is meant, an exchange of ideas and methods concerning such features as production control systems, statistical records, development of uses for the product, and education of salesmen.

A comprehensive survey was made at each plant to determine the methods of handling customers' orders and making production schedules. The data thus obtained served as the basis for establishing the fundamental principles of a standard production control system to be used at each plant. An efficient method of dealing with orders and schedules, is of course necessary in any foundry producing miscellaneous castings. In making this investigation, it was found that one company would excel in certain features in which another company was especially weak. Consequently, the result of the survey enabled all the companies to improve the parts of their production control system which were inferior to those of other companies.

The cooperation in merchandising methods has led to the intensive development of new uses for small thin-section steel castings. There has been a lack of real sales engineering and investigation of the potential market for castings in the steel foundry industry. The companies in the group are giving this thorough consideration and concerted efforts are being made to promote the use of steel castings in such parts of equipment where they give better service to the users of such equipment. At the present time there is undoubtedly a large volume of gray iron and malleable iron castings being used in parts of equipment where electric steel castings should be used to give the required strength, shock resisting properties and minimum weight. In addition to the substitution of electric steel castings for iron castings, it has been found there is a field for decreasing assembling operations when forgings are used, by combining several parts and casting them integral in one piece.

The cooperative work of the group is uncovering such cases and is developing the potential market for electric steel castings. Information concerning the production of castings having very thin sections and intricate designs, is being disseminated among users of metal products who had the opinion that steel castings can be made only with camparatively heavy metal sections and that an excessive allowance for machining must be made on steel castings.

Educational conventions of the merchandising forces of the five companies are held periodically. At these conventions, papers on steel foundry problems are presented and discussed, for the purpose of keeping the salesmen informed of the work being done in the production of castings. The conventions are part of the educational work being done by the research group to help the sales representatives understand their own products as well as competitive products, so that they become better equipped to serve the trade.

Another feature of the cooperative educational work being undertaken, is the preparation and issuance of regular bulletins to the members of the merchandising forces at all the companies. These bulletins contain information which a man in contact with consumers should know. They deal with such subjects as: Commercial specifications for steel castings as well as for other ferrous castings, significance of physical tests, characteristics of steel castings and other ferrous castings, business conditions in the steel foundry industry, research investigations and the results obtained, etc.

Conclusion

All the research investigations and cooperative work of the Electric Steel Founders' Research Group, have been of inestimable value both directly and indirectly. The employees of the different companies have taken a keen interest in the group and have been stimulated in their efforts by the spirit of competition that has arisen. Naturally, a desire has been created to know all the details of the work they are doing and the significance of these details. Such indirect results cannot be disregarded, as the success of a company depends largely on the calibre of its organization and its ability to make use of known facts having a bearing on the efficient conduct of its business.

A broad patent on the arc current welding transformers, patent No. 1,464,145, was granted Aug. 7 to Charles B. Peters, president Waters Arc Welding Corporation, 619 Tenth Avenue, New York. The company plans to add to its present line, which consists of alternating current arc welding machines and supplies, both of the grid and motor generator types, and also gas-driven welding machines.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅝ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.65c.
Squares, flats and hex	5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.80c.	.....
Nos. 22 and 24	4.60c. to 4.85c.	5.10c.
No. 26	4.65c. to 4.90c.	5.15c.
No. 28	4.75c. to 5.00c.	5.25c.
No. 30	4.95c. to 5.20c.	.....

No. 28 and lighter, 36 in. wide, 20c. higher.

Galvanized

	Per Lb.
No. 14	4.85c. to 5.10c.
No. 16	5.00c. to 5.25c.
Nos. 18 and 20	5.15c. to 5.40c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.70c.
No. 27	5.60c. to 5.85c.
No. 28	5.75c. to 6.00c.
No. 30	6.20c. to 6.50c.

No. 28 and lighter, 36-in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—41	—24	½ in. Butt...	— 4	+19
¾ in. Butt...	—46	—32	¾ in. Butt...	—11	+ 9
1-3 in. Butt..	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap...	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap.	—34	— 6	7-12 in. Lap..	— 3	+16

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18½c. to 19½c.
High brass wire	19 c. to 20 c.
Brass rods	16¾c. to 17¾c.
Brass tube, brazed	26½c. to 27½c.
Brass tube, seamless	24 c. to 25 c.
Copper tube, seamless	25½c. to 26½c.

Copper Sheets

Sheet copper, hot rolled, 21¾c. to 22¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
			Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb..	$6.55	$6.30
		90 lb..	6.65	6.40
		100 lb..	6.75	6.50
IC..	$11.75	$10.50	IC..	7.00	6.75
IX..	13.00	11.75	IX..	8.25	8.00
IXX..	14.75	13.00	IXX..	9.50	9.25
IXXX..	16.50	14.75	IXXX..	10.75	10.50
IXXXX..	18.50	16.50	IXXXX..	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	44c.
Bar	49c. to 56c.

Copper

Lake ingot	16¾c.
Electrolytic	16¼c.
Casting	16 c.

Spelter and Sheet Zinc

Western spelter	7½c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	8⅛c. to 8½c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed	31c.
No. 1 solder	29c.
Refined solder	25c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	32c. to 33c.

Old Metals

The market is firm and demand more active. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light bottoms	9.50
Brass, heavy	6.25
Brass, light	5.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	7.75
Lead, heavy	5.75
Lead, tea	4.50
Zinc	4.25
Cast aluminum	15.00
Sheet aluminum	15.00